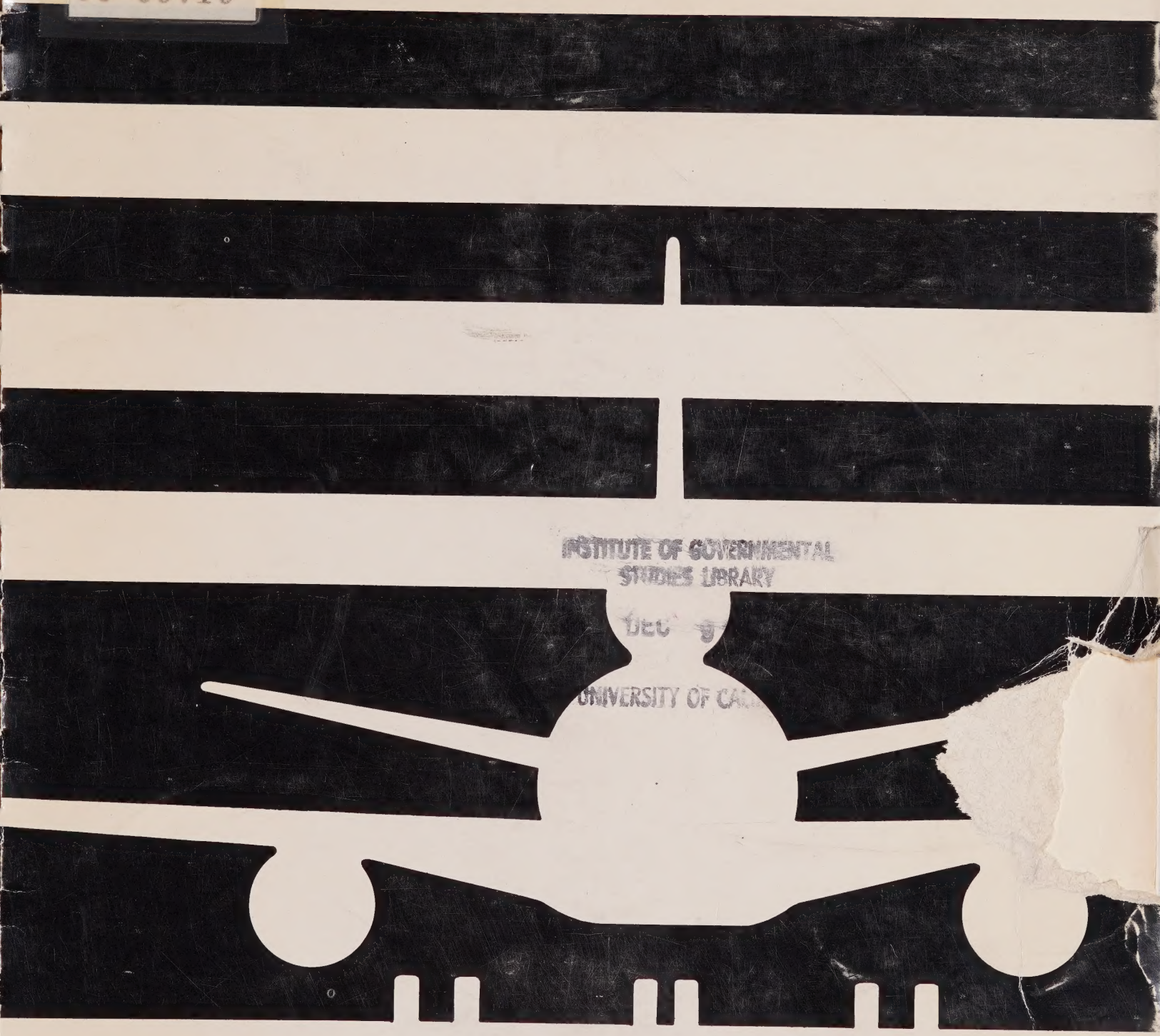

SAN JOSE MUNICIPAL AIRPORT

ARNOLD THOMPSON ASSOCIATES INC

nold Thompson Associates, Inc. ☐ Airport Consultants ☐ P. O. Box 8368 ☐ San Francisco International Airport ☐ San Francisco, California 94128 ☐ 415-692-3786

September 15, 1970

The Honorable City Council
City of San Jose, California
City Hall
San Jose, California

Re: San Jose Municipal Airport
MASTER PLAN, PASSENGER TERMINAL EXPANSION,
AND LAND USE PLAN

Gentlemen:

We are pleased to submit our findings and recommendations for the development of facilities at San Jose Municipal Airport.

With this submission, we have fulfilled our basic contract with the City of San Jose, dated March 4, 1970.

We are grateful for the cooperation we received during the course of our study and hope that we may be of continuing service to the City of San Jose.

Respectfully submitted,

ARNOLD THOMPSON ASSOCIATES, INC.

SAN JOSE MUNICIPAL AIRPORT

MASTER PLAN
PASSENGER TERMINAL EXPANSION
AND
LAND USE PLAN

SEPTEMBER 1970

ARNOLD THOMPSON ASSOCIATES, INC. □ AIRPORT CONSULTANTS

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1. Introduction

I. INTRODUCTION

The City of San Jose, California, in March 1970, commissioned Arnold Thompson Associates, Inc., airport facility consultants, to evaluate trends affecting terminal facilities at San Jose Municipal Airport and to make recommendations concerning future developments.

The specific goals of this study were to:

1. Review the 15-year airline passenger traffic forecasts to determine whether the proposed expansion of the existing facilities will be in balance with the Airport landing facility capacities.
2. Analyze existing facilities in relation to future requirements.
3. Develop an expansion program based on projected volumes of activity at the Airport.
4. Develop a staged program -- including cost estimates -- for expansion of facilities required to accommodate future activity.
5. Submit the findings in a written report, which sets forth recommendations, construction stages, and projected capital requirements.

An important consideration is the possibility that the City of San Jose may decide to develop a new airport on another site. Consequently, the recommended master plan should be staged in such a way that development of the existing site might be terminated at any time without causing an imbalance in facilities at the present Airport.

The study is directed primarily toward providing a passenger terminal facility plan. Runway planning is not a part of this study, and the Airport Layout Plan developed by the City is incorporated in the Consultant's study.

The technique followed in the study was as follows:

1. Passenger forecasts based on regional socio-economic and air transportation trends were reviewed.

2. Runway capacities were analyzed to insure that the proposed expansion of existing terminal facilities would be in balance with the capacities of the Airport's landing facilities.

3. Data was collected through surveys, questionnaires, and personal contact with key individuals and groups.

4. The findings were analyzed to relate them to forecasts and to develop the resultant projections into usable criteria, such as:

    a. Peak hour volume of passengers, baggage, automobiles, and aircraft;

    b. Size and number of aircraft loading positions;

    c. Ancillary requirements for tenants, concessionaires, and the public; and

    d. Requirements for vehicular access and parking.

5. The planning process was coordinated with the City and applicable governmental and planning agencies.

6. The information was evaluated on the basis of established facts, experience, and judgment, and translated into the final recommendations as set forth in this report.

The drawings and sketches made a part of this report are intended to be illustrative of the functional, circulatory, quantitative, and spatial relation elements which were developed from the forecasts, surveys, planning requirements, and operational characteristics of an airport terminal.

The plans and drawings are not to be considered a complete architectural or engineering solution to the problem. To portray the foregoing, it is necessary to incorporate certain architectural elements of plan, elevation, section, and mass in the drawings. The plans in this report should be the springboard from which an architect-engineer team can proceed with the development of the detailed plans, specifications, and construction documents for the recommended project.

The resultant study reflects the constribution of many groups and individuals. The Consultant would like to acknowledge the constribution of Mr. James Nissen, Airport Manager; Mr. Verne Troup, Airport Engineer; Mr. Pat Farlin, Administrative Analyst; and Mr. Walter Gillfillan, Study Director of the Bay Area Study of Aviation Requirements. The airlines were also of assistance in supplying their planning requests.

II. Conclusion And Recommendations

II. CONCLUSIONS AND RECOMMENDATIONS

Studies, analyses, and the resultant findings with respect to the aeronautical capabilities of the planned landing facility system and with respect to land use of San Jose Municipal Airport led to the following conclusions by the Consultant:

1. San Jose Municipal Airport can expect to handle approximately 3,600,000 total annual (enplaned and deplaned) passengers by 1975; 8,000,000 by 1980; and 16,000,000 by 1985.

2. The existing parallel runway system, as planned for expansion, is capable of handling airline aircraft operations sufficient to accommodate 16,000,000 total annual (enplaned and deplaned) passengers.

3. The area between the runways and the Guadalupe Parking is minimal, but sufficient for passenger terminal and automobile parking requirements for 16,000,000 total passengers.

4. The existing passenger terminal can be retained and incorporated in an orderly development of the total terminal and parking facility.

5. Sufficient land is available for Airport support facilities at the southeast end of the Airport and southwest of the runways.

6. The anticipated increased volume of airline aircraft operations will ultimately require the relocation of a substantial portion of general aviation activity from San Jose Municipal Airport to other airports in the area.

7. Based on passenger forecasts and runway capacity studies, San Jose Municipal Airport will not be

capable of expanding to meet passenger requirements in the post-1985 period.

Projections of facility requirements are based on the forecast traffic expected to use the roadway system, automobile parking facilities, passenger terminal(s), and the aircraft parking apron. It is recommended that:

1. A team of professional architects and engineers be commissioned to proceed with the detailed design of the future staged development of the Airport.
2. The first stage of an automobile parking structure to serve the existing terminal be initiated.
3. The development of detailed plans for the expansion of the existing concourses and conversion to second level passenger loading be started.
4. Action be initiated toward programming a new control tower on the southwest side of the runways.
5. Provision for planning and construction of a new fire and emergency facility on the southwest side of the runway system be made.
6. Planning for, and scheduling of, runway and taxiway improvements to accommodate forecast aircraft operations be continued.
7. A detailed study be made of the Airport roadway system. The study should be based on in-depth traffic counts, analysis, and forecast to assure adequate capacity for future air commerce.
8. A study for providing an adequate Airport access roadway system be initiated.

9. A comprehensive financial planning and feasibility study be undertaken concurrently with the detailed design of future facilities.

10. Policy on ground leases, to assure availability of land required for planned facility expansions, should be continued.

11. Efforts to establish a new air carrier airport be implemented to insure the availability of adequate airport facilities to accommodate air passenger requirements beyond the forecast level of 16,000,000 annual passengers for 1985.

III. Review Of Passenger Traffic Forecasts

III. REVIEW OF PASSENGER TRAFFIC FORECASTS

Forecasts of passenger traffic projected for San Jose Municipal Airport have been prepared by others and, during the course of this study, were reviewed and validated by the Consultant. The review was based primarily upon data and forecasts generated by the Bay Area Study of Aviation Requirements[1/] and the following assumptions:

1. The San Jose Municipal Airport air trade area consists of Santa Clara County, Santa Cruz County, southern San Mateo County (Menlo/Atherton area), and southern Alameda County (Fremont/Newark area).

2. The Airport's air trade area contains a representative cross section of the population and industry of the San Francisco Bay Area.

3. Santa Clara County and the adjoining southern portions of San Mateo and Alameda counties comprise one of the fastest growing areas in the United States.

4. With the exception of certain business and tourist travel associated with San Francisco, the San Jose area has essentially the same cities of air travel interest as the Bay Area as a whole.

5. Southern California will continue to be the primary destination of air passengers enplaning at San Jose Municipal Airport.

6. In addition to the Southern California market, other air travel markets have significant growth potential, in terms of passengers, once service is provided and promoted by the airlines.

1/ BASAR, Aviation Forecasts, prepared by Systems Analysis Research Corporation, May 1970.

7. The forecasts of population and other economic indices made by the various planning agencies within the Bay Area are reasonable.

8. The City of San Jose will continue to provide airport facilities to accommodate the air transportation requirements of the air trade area.

Population forecasts are those developed by the Bay Area Transportation Study Commission, the Bay Area Study of Aviation Requirements, and the County of Santa Clara Planning Department. The population of the San Jose Municipal Airport air trade area will increase to some 1,474,600 by 1975; 1,762,100 by 1980; and 1,981,300 by 1985.

Estimates of passenger enplanements were validated by two methods, the first of which was trend analyses. The second method involved forecasting the total number of passengers that will be generated within the air trade area and estimating the percentage of those passengers who will use San Jose Municipal Airport.

As an adjunct to, and as support for, the passenger forecasts, an Air Trade Review was made by the Consultant. The air trade data was obtained from various sources and studies and is consolidated in Appendix A.

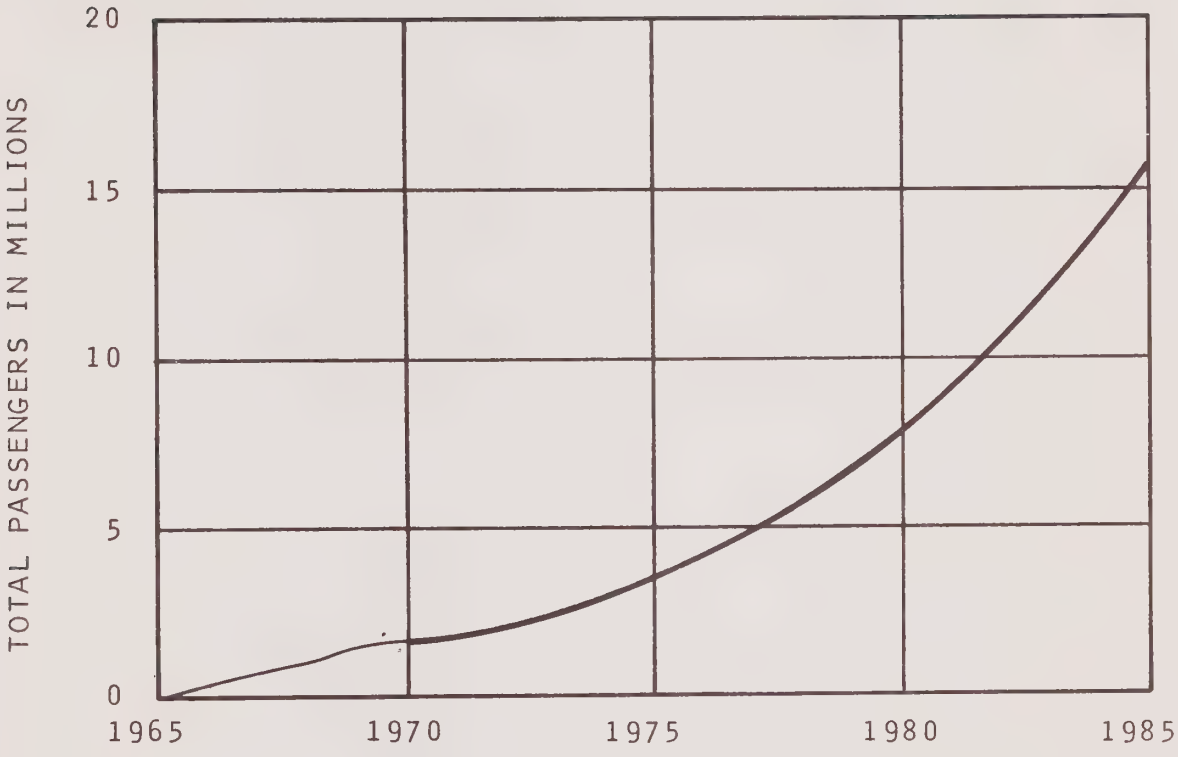
Forecasts of passenger trips generated by geographic zone within the Bay Area have been prepared by Systems Analysis Research Corporation for the Bay Area Study of Aviation Requirements. Approximately 6,349,400 people from the San Jose air trade area are expected to travel by air by 1975; 11,128,800 by 1980; and 18,718,400 by 1985. It is estimated that approximately 57% of these passengers will use San Jose Municipal Airport in 1975; 72% by 1980; and 85% by 1985. The remainder will use either Metropolitan Oakland or San Francisco International airports.

Because of the strong interrelationship and relative proximity of the three major Bay Area airports, the levels of service available (in terms of destinations and flight frequencies) are a major factor in attracting certain passengers to particular airports.

Surface travel time, although important, is not the only determining factor in the choice of an airport in the Bay Area. For example, a 1968 Stanford Research Institute Study[1/] has indicated that approximately 26% of the Bay Area passengers using San Francisco International Airport resided within Santa Clara County. Travel times from southern San Mateo County to San Francisco International Airport and to San Jose Municipal Airport, under usual surface traffic conditions, are approximately equivalent. It appears, therefore, that these people select an airport more on the basis of type and frequency of service provided than on the basis of surface travel time.

The passenger forecasts include passenger activity by the intrastate and commuter air carriers and assume that, through 1985, the rate of growth of enplaned passenger volumes at San Jose Municipal Airport will continue to be greater than the national average, consistent with recent experience. Total enplaned and deplaned passenger volumes are expected to reach 3,600,000 by 1975; 8,000,000 by 1980; and 16,000,000 by 1985.

1/ Survey of Airline Passengers Departing the San Francisco Bay Area, Stanford Research Institute, May 1968.



FORECAST TOTAL PASSENGERS
(ENPLANED AND DEPLANED)

IV. Capacity Of Landing Facilities

IV. CAPACITY OF LANDING FACILITIES

EXISTING FACILITIES

Existing landing facilities consist of three parallel runways, are utilized by various types of aircraft, and are of adequate strength for their existing use.

Runway 11-29 (3,000 feet long) is used as a touch-and-go training strip for light general aviation aircraft and has a capacity of approximately 80 operations per hour (each touch-and-go procedure is counted as two operations). Strips of this type, on unidirectional airports, may be operated independently of the main runway system during visual flight rules (VFR) conditions and are usually considered an asset on medium- or non-hub airports.

The main runway system consists of two parallel runways (Runway 12R-30L, 8,900 feet, and Runway 12L-30R, 4,419 feet). The two main parallel runways are separated by 700 feet allowing independent operations on each during VFR conditions and, when airspace considerations permit, full utilization of the runway system. The two primary runways have a VFR capacity of more than 100 operations per hour under the accepted four-minute average delay criterion. When general aviation aircraft are the predominant users, this criterion is lowered to a two-minute average delay. The latter criterion would affect the total capacity somewhat, but is not applicable to future operations anticipated at San Jose Municipal Airport.

The summation of hourly capacities results in an overall hourly capacity of approximately 130 operations per hour under VFR conditions and 72 operations per hour under instrument flight rules (IFR) conditions.

With the present three-parallel runway system and with the present aircraft mix, the annual capacity of the runway/taxiway system is approximately 400,000-425,000 operations.

It should be noted that approximately 40% of total operations in 1969 were local general aviation flights requiring a minimum of facilities. This activity, carried out in relatively slow aircraft and by students or inexperienced pilots, is not compatible with the operation of high-speed, large air carrier aircraft. In order to decrease this activity and to ease terminal airspace requirements, it is recommended that the temporary touch-and-go strip (Runway 11-29) be phased out as air carrier activity increases. With the phase-out of the temporary strip, additional general aviation airport facilities will be required in the region.

PROPOSED FACILITIES

Future airfield facilities will consist of two parallel runways, each of a length to accommodate air carrier aircraft the size of DC-10/L-1011 and DC-8/B-707. The presently planned length of 8,900 feet for takeoff and 7,900 feet for landing is adequate. Both runways should be of essentially equal length to provide for high operational flexibility.

The capacity of the planned runway system has been reviewed in detail utilizing the Airport Capacity Handbook[1/]. The hourly capacities of the proposed runway system are approximately 50 operations during IFR conditions and 70 operations during VFR conditions with a population of 75% large air carrier aircraft and 25% smaller, executive general aviation aircraft. The annual capacity of the system is approximately 346,000 operations based on this population mix.

1/ Airport Capacity Handbook, Second Edition, June 1968, Department of Transportation, Federal Aviation Administration, Systems Research & Development Services.

The airspace conditions are assessed to be somewhat restricted by nearby airports. The capacity calculations are further tempered by a large percentage of commuter type traffic which generates two daily peak periods. Of the 346,000 total operations, approximately 259,000 would be air carrier operations. The reduction in capacity from the existing configuration is due primarily to the anticipated change in aircraft population and the deactivation of Runway 11-29.

To obtain the 259,000 annual airline aircraft operations will require rigid administrative control by Airport management to restrict general aviation activity. In 1969, there were approximately 183,000 itinerant general aviation aircraft operations at San Jose Municipal Airport. Accommodating 259,000 air carrier operations will require that itinerant general aviation traffic be reduced by approximately 100,000 operations. In addition, all general aviation local and training flights will have to be conducted at other general aviation airports in the San Jose area.

To achieve this level of air carrier traffic, it would become mandatory to drastically curtail general aviation activity. It should be noted that it would be unrealistic to make this assumption unless additional general aviation facilities are made available in the region. However, this matter is beyond the scope of this report.

Passenger traffic of record indicates that within the last three years there has been an annual average of approximately 40 passengers per air carrier operation. It is estimated that this will increase to 60 to 70 passengers per operation by 1985 -- incrementally, 47 by 1975 and 54 by 1980. The 1985 calculation is based on an assumed 50% load factor and an average seating capacity of 120 to 140 passengers per aircraft. The average seating capacity is based on the assumption that

intra-state and other short-haul type of service will continue to obtain. The approximate air carrier aircraft operational capacity of 260,000 indicates that a level of 16 million total passengers could be served by the Airport. This will approach the capacity of the runway system. It is, of course, possible to overload the system but it is not an acceptable solution to maintain an adequate level of service to the public.

V. Passenger And Vehicular Activity Survey

V. PASSENGER AND VEHICULAR ACTIVITY SURVEY

A survey of passenger and vehicular activities at the Airport was conducted for a seven-day period (Tuesday, April 14, 1970, through Monday, April 20, 1970). The survey was accomplished with procedures and methods established by the Consultant and with the assistance and contributions of the airlines and concessionaires. The primary purpose of the survey was to obtain data on passenger, vehicular, and related airline activities from which typical peak hour demands, volumes, and activities could be established and related to annual passenger volumes of record. The peak hour data can then be related by extrapolation to forecast annual passenger volumes to determine future facility requirements.

The survey included unit and time counts for enplaning and deplaning passengers and baggage, airline aircraft parking position usage, and vehicular activity.

The airlines furnished data on hourly enplanements and deplanements of passengers during the survey week in addition to detailed information on aircraft parking position usage and baggage handled for selected hours of high-volume activity.

The survey encompassed vehicle counts at the terminal area entrances and exits and entailed recording details of arrival modes, length of time that vehicles used the terminal curb for loading or unloading, and employee parking lot usage.

Hourly counts of vehicles using the public parking lots were obtained from the parking lot operator.

The rental car companies provided data on hourly transactions during the survey week.

PASSENGER ACTIVITY

An analysis of the recorded hourly passenger enplanements and deplanements showed an average of 603 passengers arriving and departing the terminal during typically busy hours. The observed 603 typical peak hour passenger level represents a high plateau of hourly activity and not the absolute peak. This level of activity was met or exceeded three times during the week of the survey. Because it was necessary to conduct the survey in a month of low passenger activity, the observed data must be adjusted to reflect the activity that occurred in the peak months. Therefore, the typical peak hour passenger volumes for the year of the survey were obtained by increasing the observed 603 passengers by 33% to 800 typical peak hour passengers. The following tabulation shows the 12-month traffic pattern:

TOTAL PASSENGERS[1/]
(Enplaned and Deplaned)

1969	
May	134,202
June	148,114
July	147,792
August	165,820
September	128,532
October	130,242
November	135,038
December	136,159
1970	
January	114,978
February	114,192
March	137,004
April	110,842
TOTAL	1,602,925

Unit and area requirements are related to the 800 typical peak hour passengers. This latter figure was most likely exceeded many times during the year and should be considered as a plateau

1/ San Jose Municipal Airport Records

of high-volume activity and not the absolute peak. The 800 typical peak hour passenger activity level is comparable to other airports with traffic and geographic characteristics similar to San Jose Municipal Airport.

The 800 typical peak hour passenger figure represents 0.050% of the total 1969-1970 annual passengers in the terminal during a typical busy hour. As the total annual passenger volume increases, the ratio, or percentage, of total passengers who will use the terminal facilities during typically busy hours will decrease. While the percentage may decline as the annual volume increases, the peak hour totals will be greater in number. When a level of 16,000,000 annual passengers is attained, the percentage is expected to drop to 0.045%. The descending ratio is consistent with the findings from extensive Federal Aviation Administration (FAA) studies and applied methodology.

TOTAL PEAK HOUR PASSENGERS

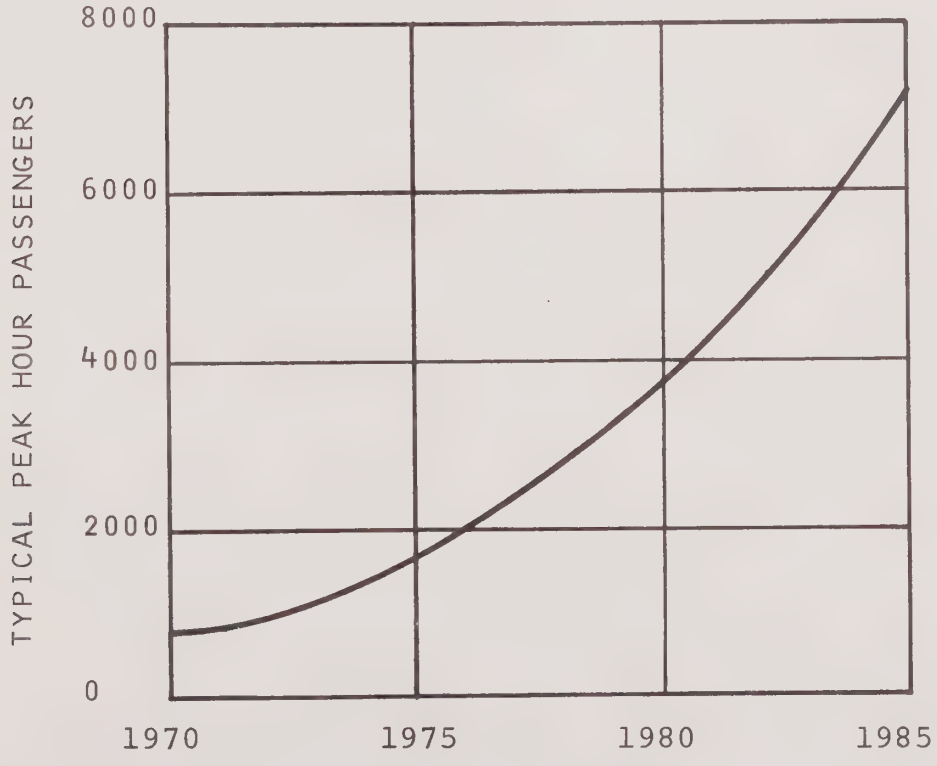
	Total Passengers	Factor	Typical Peak Hour Passengers
Actual			
1969-1970	1,603,000	0.050%	800
Forecast			
1975	3,600,000	0.048%	1,730
1980	8,000,000	0.047%	3,760
1985	16,000,000	0.045%	7,200

For the purposes of planning and sizing facilities related to either enplaning or deplaning passengers, e.g., ticket counters or baggage claim facilities, a separate analysis of the two activities was made. An adjustment of 33% was added to the observed survey peaks and indicated 485 typical peak hour enplaning passengers and 470 typical peak hour deplaning passengers. The table following shows the volumes expected for the forecast years:

ENPLANING AND DEPLANING PEAK HOUR PASSENGERS

	Total Passengers	Enplaning Factor	Enplaning Peak Hour	Deplaning Factor	Deplaning Peak Hour
Actual					
1969-1970	1,603,000	0.0303%	485	0.0293%	470
Forecast					
1975	3,600,000	0.029%	1,080	0.028%	1,000
1980	8,000,000	0.027%	2,160	0.026%	2,080
1985	16,000,000	0.025%	4,000	0.024%	3,840

The sum of typical peak hour enplaning and deplaning passengers exceeds the total typical peak hour passengers because the two rarely peak simultaneously. An analysis of the observed activity revealed this to be true at San Jose Municipal Airport and the forecasts reflect this condition.



TYPICAL PEAK HOUR PASSENGERS
TOTAL ENPLANED AND DEPLANED

AIRCRAFT PARKING POSITIONS

Historically, scheduled air carriers have not considered a shortage of parking space for aircraft a paramount element in the determination of aircraft operation scheduling. Scheduling is based on public demand by time of the day, airline competition, ability to serve transfer passengers, maximizing aircraft utilization, and providing both time and access for maintenance requirements. These conditions predetermine that aircraft parking position requirements will depend upon the independent scheduling by the airlines. This detailed scheduling cannot, of course, be forecast over long periods of time with a high degree of confidence; therefore a composite requirement is most useful. This allows the total demands of scheduled service to be met without regard for what the individual airline requirements will be in the future.

The survey indicated that six aircraft parking positions were utilized at high activity levels. The use of these positions was primarily for commuter type operations. As passenger activity increases during the forecast period, additional aircraft positions will be required. Also, other pressures, as noted above, will begin to cause the peak activity levels to be spread throughout the daylight hours, thus producing a higher utilization factor for the entire passenger complex. This is not to indicate that gate requirements will be reduced below their present level, but it will result in aircraft parking position requirements increasing at a slower rate than passenger volumes.

The historical activity at the Airport does not permit an extrapolation of aircraft position requirements for the forecast period; therefore a comparative type technique has been employed to determine aircraft parking position requirements. It is recognized that the current commuter type activity will continue with the addition of medium- and long-haul traffic.

Based on these assumptions, and considering the evolutionary change in the role of San Jose Municipal Airport from a primarily commuter type airport to a combination commuter and medium- to long-haul air passenger facility, the following gate requirements are forecast:

Year	Total Passengers	% Increase	Gate Positions Required	% Increase
1970	1,600,000		9	
1975	3,600,000	125	17	90
1980	8,000,000	120	30	76
1985	16,000,000	100	50	67

Aircraft parking position requirements are forecast to increase at a slower rate than passenger volumes. This is characteristic and reflects the efficiencies gained in space utilization as volume increases. These aircraft parking positions should be constructed to accommodate aircraft forecast to be utilized by the air carriers serving the Airport. In the forecast of operations, it was assumed that the B-707, DC-8, DC-10, and L-1011, which have similar size characteristics, will be the predominant aircraft using the Airport. Additionally, aircraft smaller than the DC-9, B-737, and B-727 will perform a minor role in future passenger operations.

This simplifies the gate size problem by defining only two classes of aircraft to be accommodated: (1) the 110-foot span and (2) the 155-foot span. Boeing 747 and SST service were specifically excluded due to the Airport's size, pavement strength limitations, aircraft clearances, and noise considerations. The Airport is able to accommodate these aircraft on an occasional basis but more frequent use is not advisable without major airfield construction.

VEHICULAR ACTIVITY

Pneumatic traffic counters were installed at five locations around the terminal complex, and a comprehensive hourly count of the number of vehicles using the roadway system was made. The results of the survey were utilized to develop vehicular circulation patterns within the Airport and to forecast future vehicular traffic volumes.

The data obtained by the survey were also used to determine passenger/vehicle relationships at San Jose Municipal Airport. During the survey week, approximately 32,000 vehicles entered the terminal complex while 13,532 passengers were enplaned -- a ratio of 2.36 vehicles/enplaned passenger. Traffic to and from areas other than the passenger terminal was specifically excluded from the survey.

During the period May 1969 through April 1970, 801,471 passenger enplanements were recorded, an average of 2,200 per day. Thus average daily traffic (ADT) entering the terminal area was approximately 5,200 during this 12-month period.

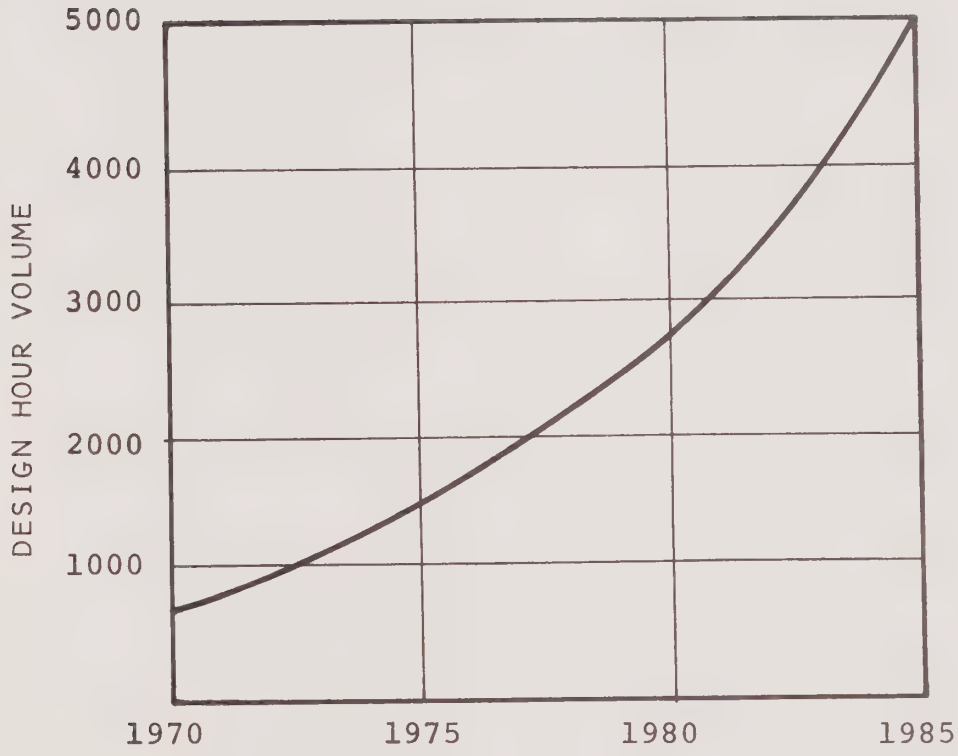
From the survey data, it was observed that 500 vehicles entered the terminal area during the peak hour. Because the recorded peak week was 33% greater than the survey week, the design hourly volume (DHV) has been adjusted to reflect a more typical peak hour activity level of 665 vehicles per hour. For the purpose of projecting DHV, it is necessary to determine the ratio (K) between DHV and ADT. With these factors calculated from the survey data and the passenger forecasts, it is possible to project vehicular traffic for the forecast period.

Year	Average Daily Enplaned Passengers	Vehicles per Enplaned Passenger	ADT	DHV	K
1970	2,200	2.36	5,200	665	13%
1975	5,150	2.26	11,600	1,400	12%
1980	10,950	2.16	23,700	2,600	11%
1985	21,900	2.10	46,000	5,000	11%

As can be seen from the chart, it is projected that the average number of vehicles per enplaned passenger will decrease in the future. This projection is based on: current trends in automobile expenses; environmental considerations; and the shift of priorities from highways to mass transit. It is expected that this trend will level off by 1985 unless there are major technological advances.

It is also assumed that the K value will decrease with time because: (1) relative peaks will usually decrease as total traffic increases and (2) the airlines tend to level out schedules as traffic increases.

The present roadway system is adequate to handle the anticipated 1975 traffic in the terminal area. When major terminal improvements are accomplished, the roadway system will be expanded and consideration should be given to providing a secondary terminal access from the northwest.



FORECAST OF VEHICLES
ENTERING AIRPORT

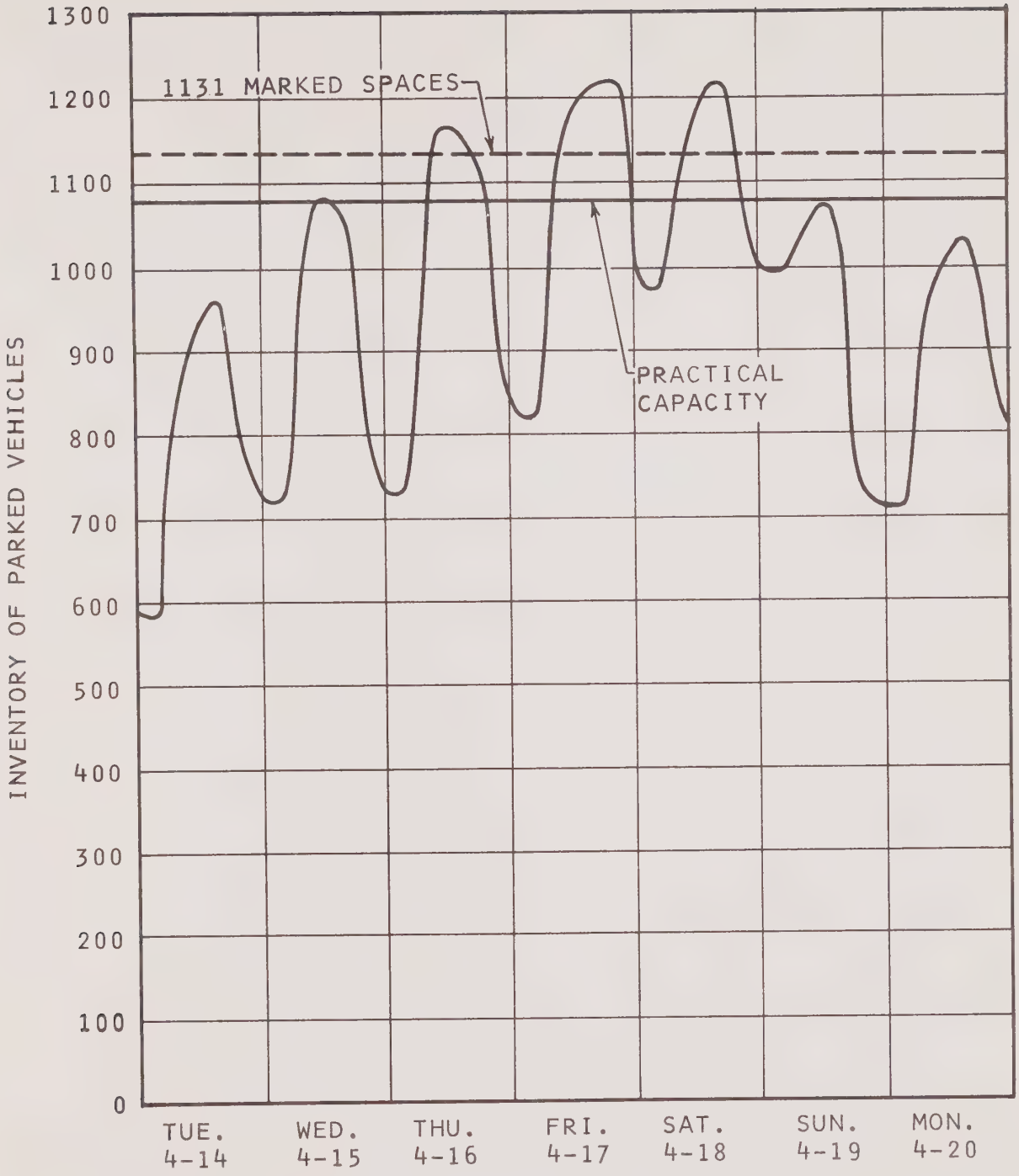
AUTOMOBILE PARKING

Analysis of data obtained in the April 1970 public automobile parking lots survey at San Jose Municipal Airport clearly indicated these facilities to be operating at or above capacity for a substantial number of hours during five of the seven days of the survey, as illustrated by the following graph. As previously mentioned, the survey was conducted during the month which produced the lowest passenger traffic for the 12-month period.

The public parking lots (1,131 spaces) were operating at a practical capacity for 45 hours out of 112 busy hours during the week of the survey. For 21 of the 112 busy hours, they were operating at, or in excess of, their capacity of marked spaces. This latter condition can occur with cars: circulating within the parking lot searching for spaces; leaving the facility; and parking in areas not designated, or marked, for parking. There were most likely times when the overflow of parking from the lots were forced to use roadside parking. It is estimated that between 30 and 50 vehicles were parked on the roadside and other areas during peak conditions.

The ratio of long-term public parking spaces available with respect to the number of short-term public parking spaces available (3.5 to 1.0) at San Jose Municipal Airport closely approximates the ratios at other airports with similar traffic characteristics. However, usage of these two facilities is at substantial variance with similar locations.

The total number of vehicles using short-term lots at similar airport parking facilities usually far exceeds the number of vehicles using long-term lots. (It is emphasized that the foregoing applies to the numbers of vehicles using facilities and not the number of spaces available. Long-term lots are usually several times the size of short-term lots.)



PEAK HOUR PARKED VEHICLES IN
PUBLIC LOTS APRIL 14 THROUGH 20, 1970

Analysis of the survey data showed that the number of vehicles using the long-term lot usually exceeded the number using the short-term lot -- a condition which existed for six of the seven days of the parking survey. This appears to stem from three factors: (1) the low differential in cost for parking in the short-term lot versus the long-term lot; (2) the walking distances from the long-term lot to the terminal facility are not excessive; and (3) the availability of free short-term parking along the terminal curbside. Therefore, the parking facilities are operated essentially as a single parking lot.

To forecast the future parking spaces required, parking demand of record is related to passenger volume of record to develop a parking demand ratio factor. The resultant factor, when adjusted for changing conditions and the effects of sustained peaks, can be applied to the forecast passenger traffic to obtain forecast automobile parking requirements.

Analysis of the data obtained from the week-long survey showed a peak inventory of 1,221 vehicles parked in lots with 1,131 marked spaces. Adding the estimated overflow of 30 parked vehicles to the number actually recorded, leads to the assumption that 1,250 spaces could have conveniently accommodated the parking demand during the survey. The survey month (April 1970) produced 55,400 enplaned, or 110,800 total, passengers. Annualizing this data would result in a hypothetical 1,330,000 total annual passengers. Therefore, from the observed data, the parking demand ratio factor was found to be 0.95 parking spaces per 1,000 total passengers (1,250 ÷ 1,330,000 = 0.00095% or 0.95 spaces per 1,000 passengers).

Because June, July, and August are peak passenger traffic months, the 0.95 factor should be increased to 1.00 to relate to the traffic of record for the year preceding the survey. It

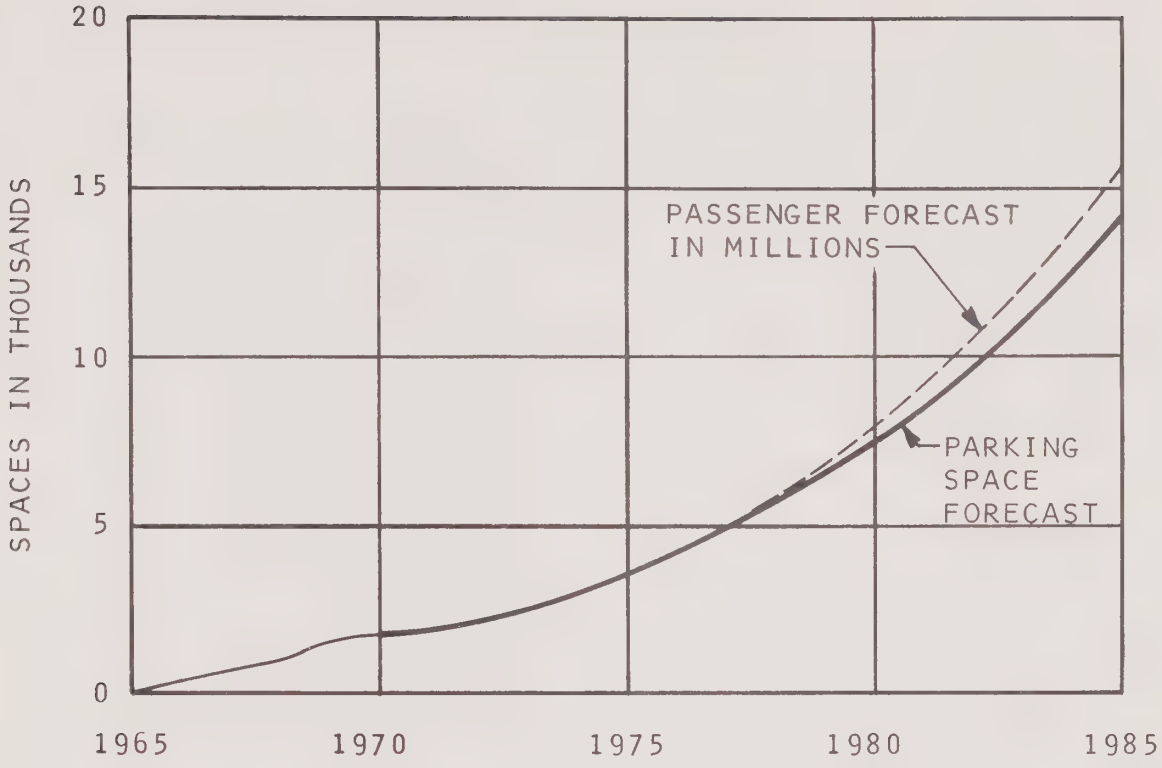
appears that the May 1969 through April 1970 traffic level of 1,603,000 total passengers warranted provision of some 1,600 public automobile parking spaces which would have adequately and conveniently accommodated the parking demand generated.

It is anticipated that the parking space demand ratio will gradually decrease by 1985 to 0.9 spaces per 1,000 total passengers. This reduction will result from such factors as the increase in the number of long-haul flights, the introduction of other means of transportation to and from the Airport, and an increase in limousine and taxi usage.

The following table outlines the forecast of required public automobile parking spaces:

Year	Total Passenger Forecast	Factor Spaces per 1,000 Passengers	Number of Public Spaces Required
1970	1,750,000	1.00	1,750
1975	3,600,000	1.00	3,600
1980	8,000,000	0.95	7,600
1985	16,000,000	0.90	14,400

The following graph shows the forecast of public parking spaces in relation to the passenger forecast.



FORECAST OF PUBLIC AUTOMOBILE
PARKING SPACES

Data obtained from the survey showed approximately 180 employee parking spaces occupied in the terminal area during the peak day. The ratio of occupied spaces to the 1,603,000 annual passengers is approximately 0.11 employee spaces per 1,000 total passengers. It is anticipated that the ratio will decrease 0.08 employee spaces per 1,000 as the passenger volume increases to 16,000,000 by 1985.

Year	Total Passenger Forecast	Factor Spaces per 1,000 Passengers	Number of Employee Spaces Required
1970	1,750,000	0.11	180
1975	3,600,000	0.10	360
1980	8,000,000	0.09	720
1985	16,000,000	0.08	1,250

CURB LENGTHS FOR TICKETING AND BAGGAGE CLAIM

Data obtained from the counts of curbside usage and vehicular types substantiates the observed existing condition of frequent curbside congestion. The existing one-level terminal, with its continuous curb, is generally capable of absorbing the traffic peaks because the enplaning and deplaning activities usually peak at different times. The continuous one-level curb has a flexibility of usage which allows the excess peak enplaning traffic to utilize the deplaning curb. This condition is reversible for peak deplaning traffic.

There is approximately 675 lineal feet of curb which is reasonably convenient to the terminal facilities. To adequately accommodate the 1969-1970 typical peak hour traffic of 800 passengers, a combined enplaning and deplaning curb length of approximately 800 lineal feet should be made available adjacent to the terminal entrances.

Vehicle dwell times and the number of vehicles using the curb, as recorded in the survey, substantiates the above requirements which can be reduced to one lineal foot of curb per typical peak hour passenger. This is in line with curb length requirements at similar airports. The ratios, when modified for future conditions, can be used for planning purposes. The foregoing obtains when the curb is used for both enplaning and deplaning activities. It is anticipated that the ratio will decrease to three-quarters of a lineal foot of curb per typical peak hour passenger as passenger traffic increases. This decreasing ratio will obtain for two basic reasons: (1) the provision of convenient close-in parking spaces in structures that will permit parking with easy access to the ticketing and baggage claim areas and (2) an increase in the availability and use of limousine or bus service and the possible introduction of rail or other mass transportation service.

The survey data revealed that 54% of the persons entering the terminal did so from the parking lots, 41% from private automobiles at the curb, and the remaining 5% from rental cars, taxis, and limousines. Leaving the terminal, 68.5% went to automobiles in the parking lots, 27.5% to private autos at the curb, and the remaining 4% to rental cars, taxis, and limousines. The data indicated that approximately 25% of the private vehicles drop enplaning passengers at the curb before leaving the Airport or entering the parking lot. The data also indicated a similar but smaller percentage enter the lot and park prior to meeting arriving passengers. These conditions are typical and the percentages are reasonably consistent with other airports with similar characteristics.

It can be seen from the foregoing that the parking lots are the chief points of ingress and egress to and from the terminal. Thus, automobile parking facilities should be provided as close to the terminal as possible and entrances and exits for the parking facilities should be planned so that use of the facility will not require all traffic to use the curbside road. This will increase parking facility usage with an attendant decrease in curbside usage. These elements exist at the present terminal and are incorporated in the terminal plan for San Jose Municipal Airport.

BAGGAGE

The airlines recorded the number of checked bags loaded on each departing flight and the number of bags removed from each arriving flight during the three-day, peak hour survey. These data were related to the corresponding number of departing and arriving passengers on the same flights and average 0.75 bags checked per passenger. In a subsequent survey, the bag-per-passenger ratio varied from 0.71 to 1.54, with an average for

all airlines of 0.82 bags per passenger. This average bag-per-passenger ratio is consistent with commuter, or briefcase type, traffic.

Future planning should account for an increase in the ratio to approximately 1.00 to 1.33 bags checked per passenger as the number of long-haul flights increases. This increase is attributable to a generally greater elapsed time between leaving and returning on long-haul flights.

VI. Forecast Of Passenger Terminal Facility Requirements

VI. FORECAST OF PASSENGER TERMINAL FACILITY REQUIREMENTS

The preceding sections developed facility sizing criteria from observed and forecast passenger volumes and activities, airline aircraft operations, and vehicular activities. The following text related the developed unit and sizing criteria to forecast future traffic volumes.

AIRCRAFT PARKING POSITIONS

Allowance has been made for exclusive airline assignment of aircraft parking positions at the terminal.

PUBLIC AUTOMOBILE PARKING

Ground space for terminal area facilities is extremely limited, and it would not be possible to provide sufficient "on-grade" parking on the site. The plan calls for public automobile parking structures, essentially above the passenger terminal facilities.

TERMINAL CURB LENGTHS

Curb length ratios were adjusted downwardly in forecasting future requirements for the reasons advanced in the preceding section. For a one-level terminal, the 1985 ratio established was 0.75 lineal feet per typical peak hour passenger, 0.81 lineal feet in 1980, and 1.0 lineal feet in 1975.

AIRLINE SPACE

The forecasts of spaces for airline activities and functions were developed by the Consultant from data supplied by the airlines. Several of the airlines were unable to supply forecast facility requirements for the 1980-1985 era or details of their space requirements for the early years of the forecast period. As future terminal increments are constructed, the airlines

will be in a position to be more specific on their space requirements. The Consultant's 1975 forecast closely approximates the requirements set forth by the now operating airlines. The forecasts do account for additional airlines being certificated to serve San Jose Municipal Airport.

DEPARTURE LOUNGES

The size of departure lounges is determined by the aircraft served. A station with a preponderance of originating and terminating traffic should provide approximately 10 to 11 square feet of departure lounge for each seat on the airplane that is accommodated. This allows for circulation space, ticket check-in counters, and seating.

BAGGAGE CLAIM PUBLIC SPACE

Forecast space allocations were established from the bag-per-passenger data developed in the preceding section, the expected peak loads and the area requirements for a moving display, self-claim racetrack or carrousel type baggage dispenser. Adequate circulation space is included.

FOOD AND BEVERAGE FACILITIES

Forecast space allocations were obtained from extrapolating data on existing facilities to accommodate future needs anticipated from the forecast traffic volumes. These spaces, as with airline space, can be provided in the quantities required as the need develops. The amounts indicated are considered adequate and can be affected by many factors, such as type and quality of food, beverages, and service; specialties; local similar competitive services; provision for employees; and airline in-flight facility requirements, to name a few.

CONCESSIONS

Adequate space has been forecast for basic concessions normally required by the air traveling public. As with food and beverage and airline facilities, area requirements depend on many similar factors, as well as the marketing capabilities of the concessionaires.

AUTO RENTAL FACILITIES

A minimum facility for a rental and check-in facility would consist of 10 to 12 lineal feet of counter which would be capable of accommodating three positions for rental/return transactions. This should adequately accommodate up to 20 transactions per hour and provide a good service level to customers. For each additional 10 hourly transactions, an additional counter unit should be considered. The table following does not include a schedule of auto rental counter facilities since the terminal plans are sufficiently flexible and expansible to accommodate needs as they develop.

SUMMARY

The following tables summarize the forecast of terminal requirements and the facilities provided by the Terminal Master Plan.

FORECAST OF TERMINAL REQUIREMENTS

San Jose Municipal Airport

	1975	1980	1985
TOTAL ANNUAL PASSENGERS (Enplaned and Deplaned)	3,600,000	8,000,000	16,000,000
TERMINAL REQUIREMENTS			
Typical Peak Hour Passengers	1,730	3,760	7,200
Aircraft Parking Positions	17	30	50
Public Automobile Parking Spaces	3,600	7,600	14,400
Employee Parking Spaces	360	720	1,250
Terminal Curb Length	1,700 l.f.	3,200 l.f.	5,400 l.f.
Ticket Counter Length	360 l.f.	900 l.f.	1,300 l.f.
Ticket Counter Offices	7,200 s.f.	18,000 s.f.	26,000 s.f.
Ticket Lobby	12,600 s.f.	31,500 s.f.	45,500 s.f.
Departure Lounges (size varies)	17	30	50
Baggage Claim Public Space	24,000 s.f.	51,000 s.f.	72,000 s.f.
Moving Claim Display Devices (of 75-foot length)	8	17	24
Airline Operations	36,000 s.f.	60,000 s.f.	90,000 s.f.
Food and Beverage Facilities	22,000 s.f.	44,000 s.f.	80,000 s.f.
Concessions	5,700 s.f.	12,500 s.f.	24,000 s.f.

SUMMARY OF TERMINAL FACILITIES
PROVIDED BY THE TERMINAL MASTER PLAN

Total Annual Passengers	3,600,000		8,000,000		16,000,000	
Peak Hour Passengers	1,730		3,760		7,200	
FORECAST YEAR	1975		1980		1985	
Construction Stage	1	1a	2	2a	3	3a
Aircraft Parking Positions	10	18	26	34	42	50
Automobile Parking Spaces	2,400	3,500	5,300	7,900	10,600	12,600 1/
Terminal Curb	870	1,710	2,550	3,390	4,230	5,070
Ticket Counter	310	510	710	910	1,110	1,310
Baggage Claim Area	13,200	25,000	38,500	52,000	65,000	78,000

1/ The forecast requirement is 14,400 spaces. The additional spaces can be provided by adding parking levels on the terminal(s) where the greatest demand occurs as all terminals will not require the same number of parking spaces.

VII. Airport Land Use

VII. AIRPORT LAND USE

LANDING FACILITIES

The present runway system is well designed for its present function. The system of three parallel runways is well suited for general aviation activity allowing simultaneous touch-and-go training operations during clear weather when these activities are usually conducted. The runway orientation is excellent from a meteorological standpoint, giving wind coverage in excess of 99% of the time in the available directions. No crosswind runway is required.

The existing runway lengths of 8,900 feet and 4,419 feet on Runways 12R-30L and 12L-30R, respectively, do not present a problem. A difficulty will arise, however, when air carrier operations increase to a level requiring the use of both runways. Maximum capacity is achieved with minimum air traffic control problems when the inner runway is utilized primarily for departures. This can be achieved in both directions only if the runway lengths are substantially equal. It is, therefore, recommended that Runway 12L-30R be extended as shown in the 1970 Layout Plan to 8,900 feet.

Instrument approach facilities should be provided on Runway 12R to facilitate landing in a southeast direction. The recommended approach facilities will depend upon further studies. This will allow all landings to be conducted on the outer runway, with respect to the terminal, and reduce runway crossing problems.

Runway to runway separation required for independent simultaneous instrument operations of any type cannot be achieved on this site. Therefore, optimum capacity of a two runway system cannot be attained; this will be the restraining factor for

future air carrier operations. Such operations must be accomplished on a scheduled basis as high delays resulting from restricted capacity during instrument conditions are intolerable.

Runway strength is adequate for the operation of four-engine transport aircraft during the early stages of the forecast period. The design strength as proposed in the 1970 Airport Layout Plan should be reviewed to insure the capability of the Airport to serve aircraft weighing in excess of 400,000 pounds. This will be required during the forecast period.

TAXIWAYS

The presently planned taxiway system, with the addition of high-speed exits, should be adequate. A separation distance of 300 to 350 feet is not in conformance with newly established FAA standards but should not be changed considering the cost and the existing site limitations. Strengthening of most taxiways will be required to serve the additional activity and loads forecast. Consideration should not be given to a parallel taxiway between the runways. If insufficient area is available for holding arrival aircraft between the runways prior to crossing, the inner runway should be used for arrivals and alternative access routes should be constructed between taxiways "A" and "B" and "I" and "J" to serve holding aprons constructed south of Runway 12R-30L.

PASSENGER TERMINAL

The present terminal has nine air carrier aircraft parking positions. The forecast planning requirement is 50 aircraft parking positions, many of which will accommodate "air bus" size aircraft. Studies have shown that it is practical and feasible to add to the existing terminal building as the present terminal area is well located in relation to the runway system

and to ground access. In order to provide sufficient space for a complex of the forecast size, it is necessary to extend the terminal area approximately 4,000 feet to the northwest and approximately 3,000 feet to the southeast, creating a space 8,000 feet long. As the site is lacking in depth, portions of the Guadalupe River will have to be spanned by structures and roadways. Virtually the entire strip on the northeast portion of the Airport consisting of approximately 185 acres will be devoted to terminal use.

If the forecast 14,400 cars were to be parked on grade, a space in excess of 115 acres would be required leaving approximately one-third of the available terminal area for aircraft apron, buildings, roadways, and related terminal facilities. Therefore, parking structures are necessary and are proposed for the bulk of the cars. This will make the most efficient use of the limited available land and will provide the public short, comfortable access from car to airplane.

Spanning the Guadalupe River will make the City-owned 20 acres northeast of the River available for Airport use. Employee parking, rental car maintenance areas, and possibly a service station could be located in this area. However, more space for these purposes is required than can be provided in the terminal area, and it is proposed that additional land be considered northeast of Guadalupe Freeway. This area could also be used for motel development. The economic feasibility of acquiring this land is a matter for additional study.

AIR CARGO AND AIRMAIL FACILITY

For the next ten years or so, it is anticipated that most of the air cargo and mail will be carried in belly compartments of passenger aircraft. An inexpensive building, along with cargo handling facilities on the lower level of the proposed

new concourses, will suffice for this purpose. A cargo facility located southeast, and in proximity of the existing terminal building as shown on the current Airport Layout Plan, is adequate for interim use. This site has good roadway access and space is available for the construction of apron areas for all-cargo aircraft.

Approximately nine acres in the southeast corner of the Airport property has been designated as the location for a more sophisticated air cargo and airmail facility. This facility will require, and the site can be developed to provide, space for aircraft parking and truck unloading.

Sufficient land is available southwest of the runways for additional cargo terminals and apron should the requirement ever develop.

Transfer of cargo between the passenger terminal or aircraft and the cargo terminals will be on the internal service road and apron with only those airline vehicles authorized to operate on the internal roadway system.

FIRE AND EMERGENCY BUILDING

The present fire and emergency building can remain where presently located until the last phases of terminal construction take place. At that time, it is recommended that it be relocated to a more central location on the southwest side of the Airport. The site designated provides easy access to any point of the airfield and has excellent visibility. Detailed planning of this facility should await airport certification standards now being developed by the FAA.

CONTROL TOWER

Consideration should be afforded to locating the control tower to the area southwest of the runways to provide improved

visibility to the runway approaches and the aircraft parking apron, as proposed. The control tower, if it were to remain in its present location, would have some adverse effects on future terminal construction and possibly on apron usage. The tower facility and the new fire and emergency facility could well be sited in the same general area.

AIRPORT/AVIATION RELATED FACILITIES

The 85 acres of land southwest of the runways should be reserved for possible air carrier hangar and maintenance facilities, flight kitchens, and, as suggested above, for the control tower and fire and emergency building. Space would also be available for other airport/aviation related facilities.

GENERAL AVIATION

General aviation activity is planned to decrease as commercial aviation increases. Over one-half of the existing 75 acres now being used for general aviation purposes will be given over for passenger and air cargo terminal needs. The general aviation facilities in the southerly sectors of the Airport will remain in use, but no new areas should be developed for general aviation functions. This latter point is dealt with in the discussion relating to landing facilities capacities and usage.

VIII. Airport Access, Airport Roadway System, And Rapid Ground Transportation

VIII. AIRPORT ACCESS, AIRPORT ROADWAY SYSTEM, AND RAPID GROUND TRANSPORTATION

AIRPORT ACCESS

The San Jose Municipal Airport is well served by the existing roadway system. Access for the estimated 5,200 daily vehicles presently entering the terminal area is within the capacity of the existing Airport roadway system. The primary automobile route, immediately prior to entering the terminal area, is via a trumpet intersection providing access to the Guadalupe Freeway. The structure crossing the Guadalupe River, immediately north of the terminal area, will be the first order of constraint as traffic develops.

Distant access from all directions appears to be adequate via the many freeways in the southern Bay Area. A secondary constraint to automobile access will be the immediate Airport entrance via the Brokaw Road Interchange. A schematic solution of a full interchange with the Guadalupe Freeway has been shown on the plans. This area should be the subject of a complete traffic and engineering study to determine both the total volume of traffic and the capacity of the existing interchange. This is beyond the scope of this report.

Additional access to the terminal areas will be available via Airport Road or its replacement. It may be possible to develop a simple interchange serving Airport traffic from and to the southwest via Interstate 280 and State Route 17. In order to make this as economical as possible, the interchange should be west of the Guadalupe Freeway avoiding an additional structure.

A secondary route from the Bayshore Freeway west of the Guadalupe River is possible but additional capacity to serve westbound traffic via Guadalupe Freeway is probably more feasible due to the proximity of the Trimble Road/De La Cruz Boulevard

Interchange with the Freeway. If a secondary route in this area is essential, it is probably best located at Kifer Road and De La Cruz Boulevard. This would allow traffic to enter the Airport along the Frontage Road right-of-way and avoid an additional Bayshore Freeway interchange and an additional crossing of the Guadalupe River.

Each of these alternatives should be subject to volume/capacity, value engineering, and public acceptability studies.

AIRPORT ROADWAY SYSTEM

The internal roadway system is based on developing the most direct system to serve three passenger terminals and parking structures with the least interface of traffic. The need for secondary access to the complex has been recognized and is accomplished using highly divergent travel routes to the terminal complex. These routes give the option of avoiding congested traditional means of approach without creating mandatory indirect paths. Entrances and exits are provided at the north and south ends and at a point as close to the focus of the complex as could be provided.

The major collector-distributor (C-D) route is formed by the east Airport roadway. Traffic is circulated in both directions with minimum lateral separation except at the main Airport entrance (Brokaw Road). Provision has been made for at-grade interchanges in later stages for entrance onto the east Airport roadway. The major traffic flows are not required to use these crossings.

Entrance to the central terminal area in the first stage is similar to today's roadway system. At-grade decision points are provided for either terminal or parking selection prior to entering the structural building area. Recirculating traffic

traverses a circular route back to the C-D roadway and thence back to the terminal-parking decision point. Traffic exiting the Airport via any of the three routes provided travels on the same C-D road to the north or south without conflict.

During the intermediate stages of construction, as the second main complex is erected, a secondary access from the De La Cruz Boulevard would be valuable. This would allow direct access from the north to the additional complex and to the first stage development. Supplemental access from the south and southeast may be desirable. These routes could connect both Interstate 280 and the Guadalupe Freeway to the south end of the terminal site. Air cargo access will be via the existing Airport Road, or its replacement, and enter the Airport at the west boundary.

Additional terminal and accompanying roadway construction will allow the full potential of the site to be realized. When the complex is completed, traffic will flow in a counter-clockwise direction around each of the parking structures to and from the main collector-distributor roadway parallel to the main axis of the Guadalupe River. Cross flow will occur for southbound traffic exiting either of the two south terminals and destined north on the main collector road. These intersections should be controlled by automatic devices and no major congestion should develop.

It should be noted that the roadway development is indicated in schematic form and engineering studies should be performed prior to final design.

RAPID GROUND TRANSPORTATION

Provision has been made within the terminal complex for a BART-type rapid transit system. Development of this system should, of course, reduce roadway volumes per passenger. The

magnitude of the resultant values would be dependent upon many unmeasured factors, such as route system, cost, availability, and comfort. This data should be quantified if such a system is proposed and the terminal roadway adjusted as required.

IX. Master Plan Of The Building Area

IX. MASTER PLAN OF THE BUILDING AREA

PLANNING CONSIDERATIONS

Planning of the passenger terminal and its related support facilities was influenced strongly by the premise that the total terminal plan should be in balance with the landing facility system and capacities. Another strong influence was the constraint imposed by the available site which is severely limited in depth between the runway and the property line. Other types of basic operational plans were investigated and reviewed with Airport management, some of which extended beyond the present Airport property, e.g., a scheme employing a remote transportation center for auto access and parking, rapid transit stop, terminal facilities served by mobile lounges or automated people movers shuttling between the center and remotely parked aircraft.

After a review of these schemes, it was decided to plan within the present Airport boundaries with some freedom in bridging the Guadalupe River.

Preservation and incorporation of the existing passenger terminal in the plan was considered of paramount importance, and the plans in this report accomplish this objective.

Other basic planning considerations include the fundamental concept of providing:

1. A plan with minimum walking distances between the terminal curb (or the parked automobile) and the airplane;
2. A simple, self-revealing circulation pattern for automobile routes and for passenger and visitor flow;

3. Concession facilities conveniently located without interferring with passenger flow;

4. A flexible plan allowing modifications to accommodate changing operational procedures;

5. A scheme that can be expanded to meet future requirements without major disruptions to service;

6. An economically feasible development plan;

7. A terminal complex plan that can be constructed in stages on a demand basis; and,

8. Buildings that are convertible to other uses should the Airport ever be converted to other than the air carrier airport serving San Jose.

DETAILS OF PROPOSED TERMINAL AREA DEVELOPMENT

The ultimate passenger terminal complex will be comprised of three unit terminals. After passing over a widened bridge spanning the Guadalupe River, cars entering on the main access roadway may go to any of the three terminals without passing through either of the other buildings. Although some entrance and exit roadways leading to and from the Guadalupe Freeway will be commonly used, each unit terminal will virtually have a separate road system. Provision has been made for recirculation within each terminal area and the roads are interconnected making it possible to travel easily from one unit terminal to another. The existing secondary access roadway from the southerly corner of the Airport will remain in use. Another roadway from the northeast area can be constructed, if necessary, to relieve the possible congestion at the main terminal access point.

Cars to be parked will pass by ticket-dispensing machines, enter clearly visible, gently curving, spiral ramps to the parking decks or direct to grade-level parking under the

structure. The use of electronic traffic guidance sign systems with automatic overriding manual control, indicating levels with vacant spaces, is recommended to eliminate unnecessary searching for parking space. The ramps are designed, however, to permit interlevel, recirculating traffic. Similar ramps now in use were carefully researched, observed, and analyzed to assure acceptance by inexperienced motorists.

Traffic will pass the terminal areas in a one-way, counter-clockwise direction to permit right-hand loading and unloading. The roads in front of the terminals are four lanes wide. The curb lane is for stopping, with a second lane to allow for maneuvering, or for the inevitable double parker. The two outer lanes are reserved for moving vehicles.

The required curb lengths are achieved by developing the terminals in a linear form and by spacing the ticketing and baggage claim areas. Effective curb lengths are further reduced by the convenience and proximity of short-term and structural parking.

At each parking level, supplementary curbs are provided for vehicles dropping passengers and baggage at the vertical circulation towers before parking. Normally, one of the most serious problems at an airport is the congestion of cars at the baggage claim curb. Each of the parking levels will have provision for the future installation of baggage conveyors and dispensers. By making it possible to park near the baggage claim area on any of the parking levels, it will be more convenient to park than to stand at the curb.

Rental cars are accommodated in special sections on the ground level under the parking decks and adjacent to the car rental counter areas. A remote area is also suggested for rental car storage and maintenance.

Taxi and limousine holding areas are located off the main entrance roadway. Vehicles will be summoned by dispatchers or electronic signaling devices.

Public parking will be provided in the parking structures which can ultimately provide more than 14,000 parking spaces. Employee parking will be provided in remote parking areas to be served by buses.

Provision has been made for a possible rapid transit system which would serve the central terminal unit only and could be supplemented by an internal transit system. This internal system could be as simple as a bus providing transportation from one terminal to another or a more sophisticated automated system.

Complete protection from the weather will be afforded boarding passengers from the curb (and most of the parking spaces) to the airplane. This is made possible by the parking structure or canopy providing cover, the terminal and concourses being enclosed, and the use of passenger loading bridges spanning from the second floor of the building to the airplane door.

Each unit terminal will house ticketing, baggage claim facilities, concessions, and public seating. Each terminal is actually two terminals with one-half a reflected plan of the other. Each half, serving eight gates, will have separate facilities and can operate independently of the other. Passengers arriving at the curb can go directly to the ticket counters and proceed on the ground level to escalators, on either end of the building, which lead to the second-level departure areas. Passengers arriving from the parking structure will take elevators to the ticketing level, or if preticketed, they may go directly to the departure area. A second-level corridor over the main terminal structure will connect the two departure areas and eliminate change of levels.

Baggage received by the airlines via ticket counter, curbside, or parking level drop-off points will be conveyed to the baggage handling areas behind the ticket counters for processing onto aircraft. Inbound baggage will be dropped off on conveyors in an area adjacent to the baggage make-up facility and then fed into a sub-floor tunnel for distribution to mechanized baggage dispensers on the ground level under the parking decks. A shaft will be provided in the vertical circulation towers for the possible installation of a conveyor system to the baggage claim areas in the parking levels (for passenger convenience) when its investment can be supported by the air carriers.

Restaurant, rental car, and ground transportation facilities are located at central points in the terminal units so that they may be shared by both sections of the terminal.

Receiving and claiming of air cargo by the consignors and consignees should be accomplished at the remoted cargo terminal. The airlines should handle cargo shipments with their vehicles on the apron between the cargo terminal and the cargo handling areas in the terminal or planeside. Airmail would be handled similarly from the same remoted cargo areas.

The vehicular terminal roadways also double as service roads for the terminal concessions and other functions. Service vehicles related to airline operations will circulate on the apron side of the terminals. Space permitting, it would have been better to provide a separate service road; however, there are numerous airports operating successfully with a combination service and terminal roadway system.

If an international arrival and clearance facility would be required at some future time, one could be provided on the ground floor level of one of the concourses.

STAGING PLAN

The use of existing facilities plus continued uninterrupted operation are a great influence on the terminal design and staging of construction. The construction that is taking place today will satisfy the immediate requirements for ticketing and baggage claim space. Automobile parking space is critically short today, and the initial stage of this Master Plan provides the needed parking. This can be accomplished by providing a parking structure in front of the present terminal. The early parking structure construction will be in the present grade-level parking area clear of the existing terminal building and entrance roadway.

Subsequent stages will add second-level departure lounges to the existing terminal and update the present gates. Full development of the existing terminal site will be accomplished when additional terminal facilities and gates are added to the northwest. At this stage, there will be 18 aircraft parking positions. Ultimately, the parking structure will be extended over the lower portion of the present terminal, as well as the new construction, unifying the new and existing structures.

Some roadway modification will be necessary in this initial planning stage but, for the most part, existing roads will remain in use. A new roadway system will provide access to a new terminal area site to the northwest. Considerable site work will be required to gain the space required for this terminal area. Culverts and landfill will make it possible to build structures and roadways over the Guadalupe River. The terminal has been designed to be constructed in stages which can be added in eight-gate increments.

Levels of structural parking will be added as required until the necessary 5,000 parking spaces have been furnished. The

16 aircraft parking positions that will be obtained by the development of this terminal area will provide a total of 34 gates. Parking facilities for automobiles can reach 10,000 spaces in the second stage.

A third terminal area can be developed to the southeast of the present terminal. This construction will also require extensive site development and road work. In addition, the bridge spanning the Guadalupe River will be widened, and land now being used for general aviation facilities will have to be used for the terminal facility. This unit terminal will be similar to the previously constructed terminal facility. All three units will function in a like manner and will be compatible architecturally. Design and staging are planned to achieve the utmost use of the existing facilities and to blend each construction phase to ultimately form a complete and coordinated terminal complex. In 1985, or when a 16,000,000 annual passenger volume is attained, the completed terminal complex will have 50 gates and be able to accommodate more than 14,000 parked cars.

CONSTRUCTION COST ESTIMATES

Preliminary estimates of construction costs for terminal additions, aircraft parking aprons, automobile parking, and on-airport roadways total approximately $114,500,000, in terms of 1970 construction dollar values. The amount includes fees, testing, supervision, administrative costs, and contingencies.

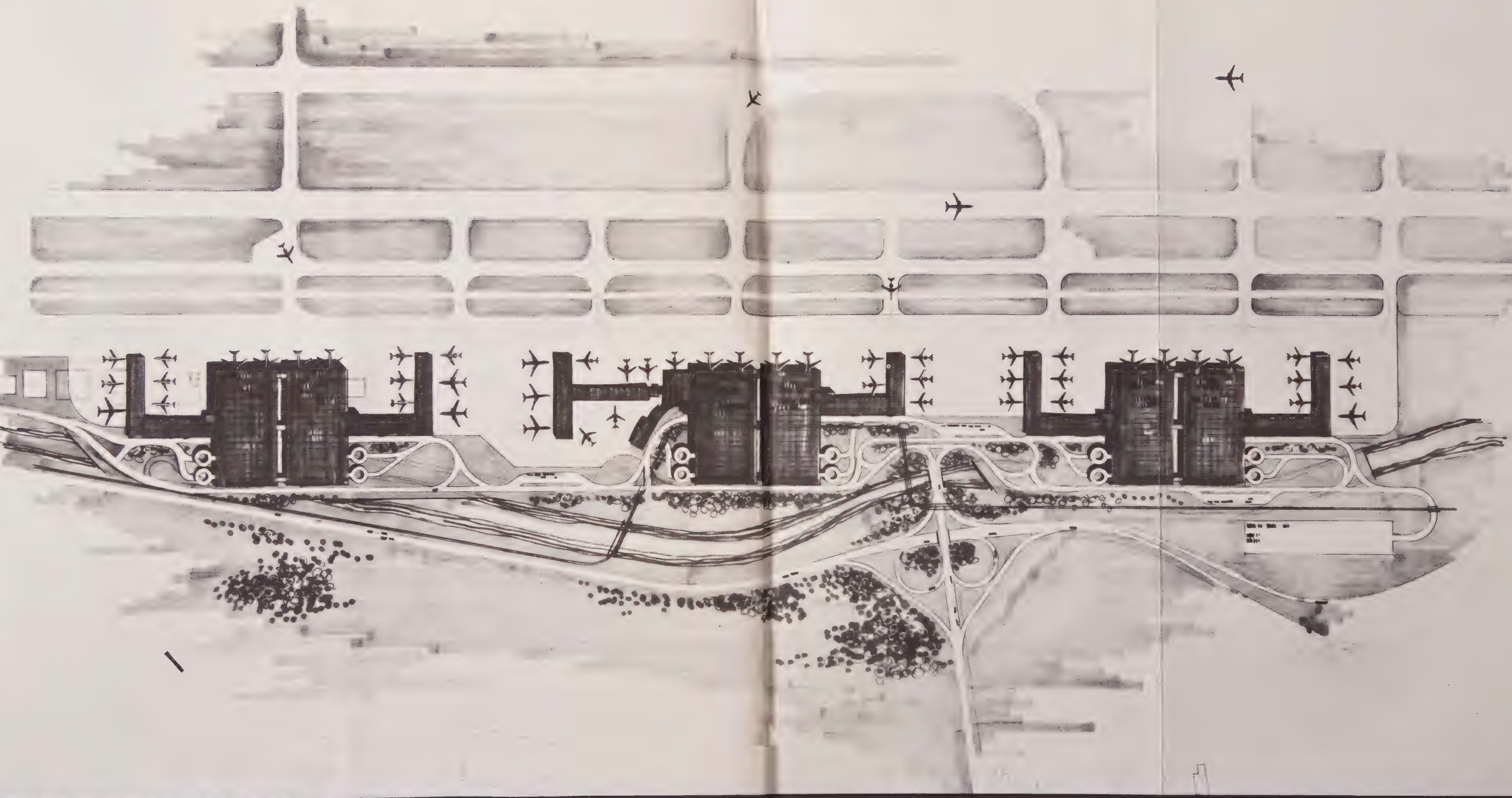
Approximately 50% of the estimated construction cost is attributable to automobile parking facilities. The schedule following shows estimated capital expenditures by stages and approximate years.

COST ESTIMATES
PASSENGER TERMINALS AND RELATED FACILITIES

COST ESTIMATES
PASSENGER TERMINALS AND RELATED FACILITIES

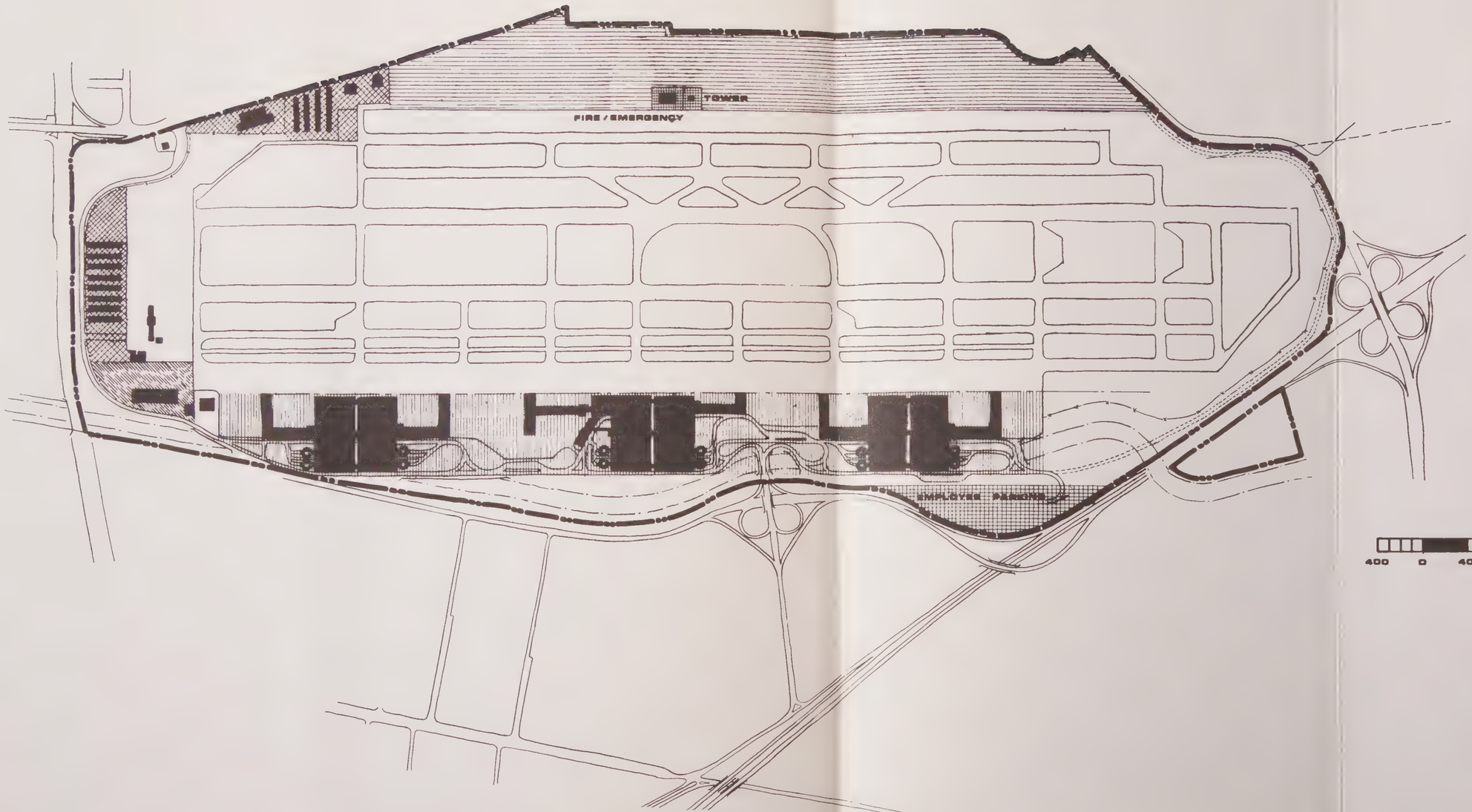
	1975 STAGES 1	1a	1980 STAGES 2	2a	1985 STAGES 3	3a	TOTAL
SITE WORK AND MISCELLANEOUS	$ 170,000	$ 110,000	$ 3,740,000	$ 2,530,000	$ 5,460,000	$ 2,550,000	$ 14,560,000
TERMINAL	$ 3,230,000	$ 7,200,000	$ 6,580,000	$ 6,580,000	$ 6,580,000	$ 6,580,000	$ 36,750,000
APRON	$ 400,000	$ 1,850,000	$ 1,560,000	$ 1,580,000	$ 1,500,000	$ 1,500,000	$ 8,390,000
AUTOMOBILE PARKING	$ 9,060,000	$ 5,350,000	$ 5,860,000	$11,100,000	$11,860,000	$ 8,950,000	$ 52,180,000
ROADWAYS	$ 140,000	$ 90,000	$ 560,000	$ 510,000	$ 800,000	$ 520,000	$ 2,620,000
TOTAL	$13,000,000	$14,600,000	$18,300,000	$22,300,000	$26,200,000	$20,100,000	$114,500,000

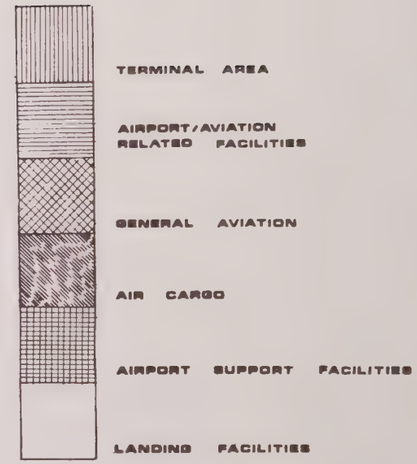
X. Drawings



SAN JOSE MUNICIPAL AIRPORT

ARNOLD THOMPSON ASSOCIATES INC





LAND USE PLAN

SAN JOSE MUNICIPAL AIRPORT

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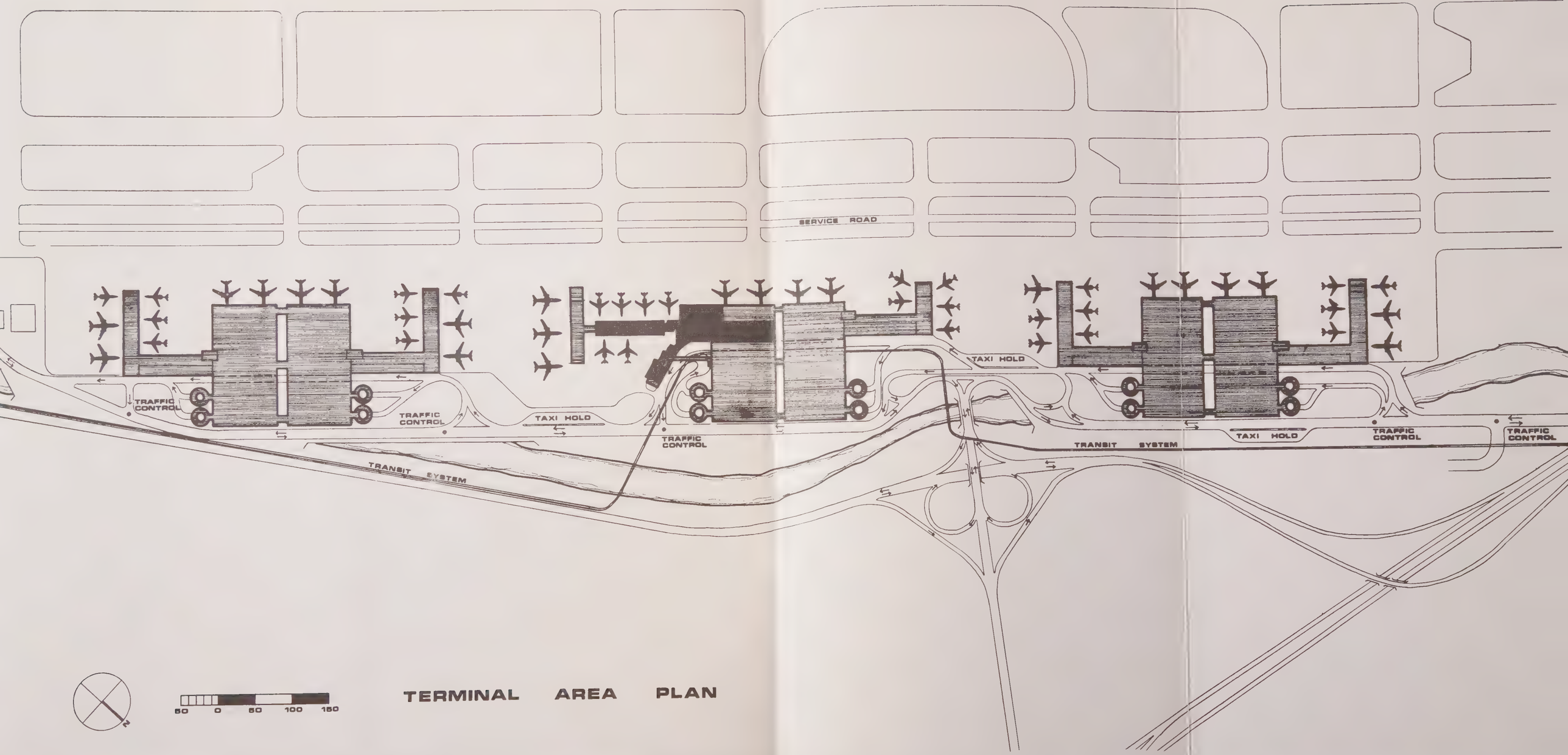

TERMINAL AREA PLAN

SAN JOSE MUNICIPAL AIRPORT

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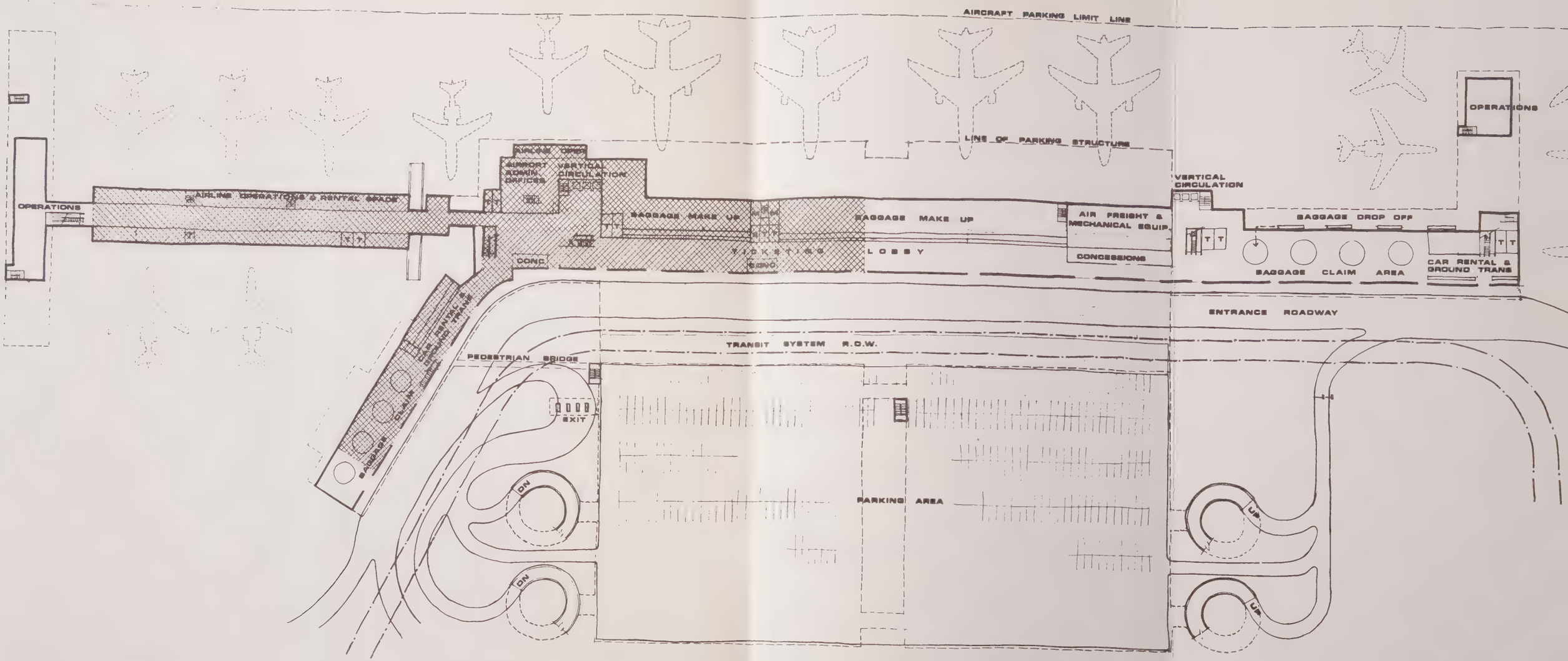


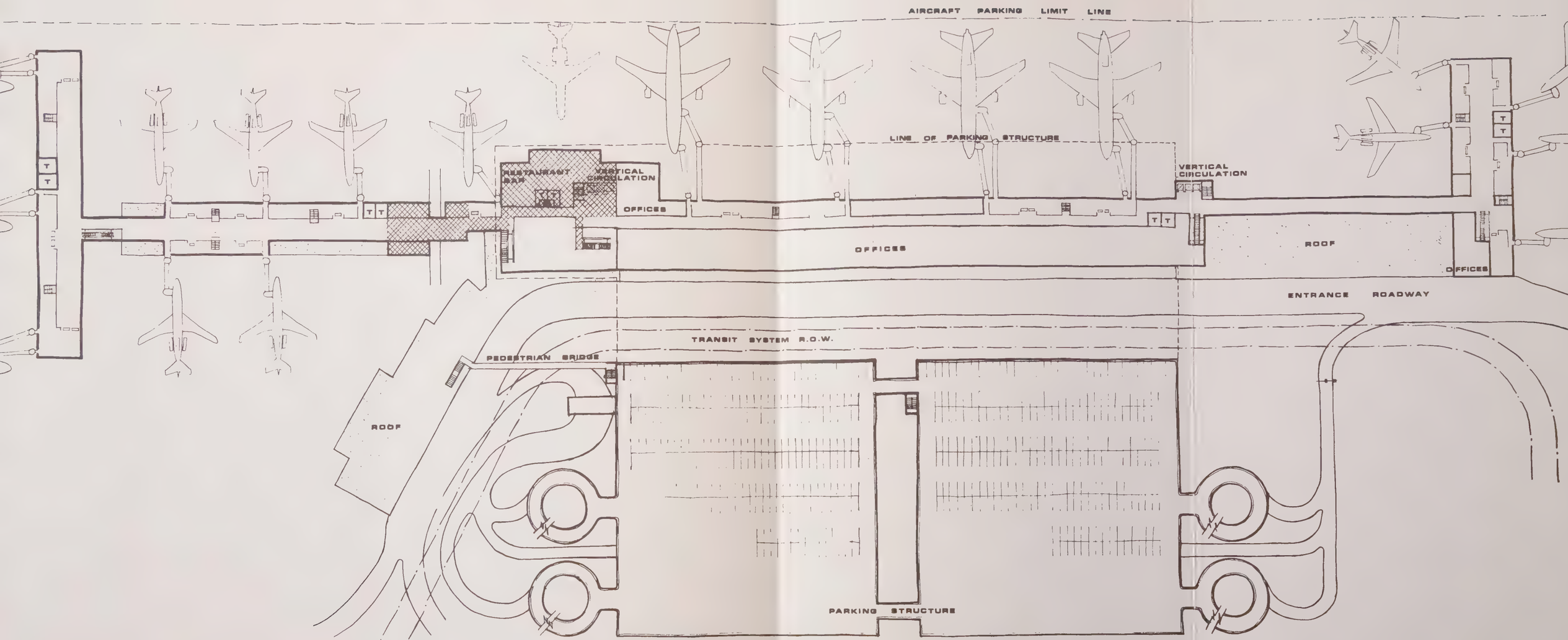
GROUND LEVEL PLAN

EXISTING TERMINAL

50 0 50 100 150

SAN JOSE MUNICIPAL AIRPORT

ARNOLD THOMPSON ASSOCIATES INC



SAN JOSE MUNICIPAL AIRPORT

ARNOLD THOMPSON ASSOCIATES INC

SECTION

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AIRCRAFT PARKING LIMIT LINE

AIRLINE OPER.

LINE OF PARKING STRUCTURE

RESTAURANT BAR & CONCESSIONS

AIRLINE OPERATIONS

MECH. EQUIPMENT SERVICE & STORAGE

VERTICAL CIRCULATION

RENTAL CAR & SHORT TERM PARKING

AIRLINE OFFICES

BAG MAKE-UP

BAGGAGE DROP OFF

TICKET LOBBY

CONCESSIONS

BAGGAGE CLAIM

CAR RENTAL & GROUND TRANS.

ENTRANCE ROADWAY

PARKING

DN

DN

PARKING

VERTICAL CIRCULATION

POSSIBLE OFFICE SPACE

OFFICES

N

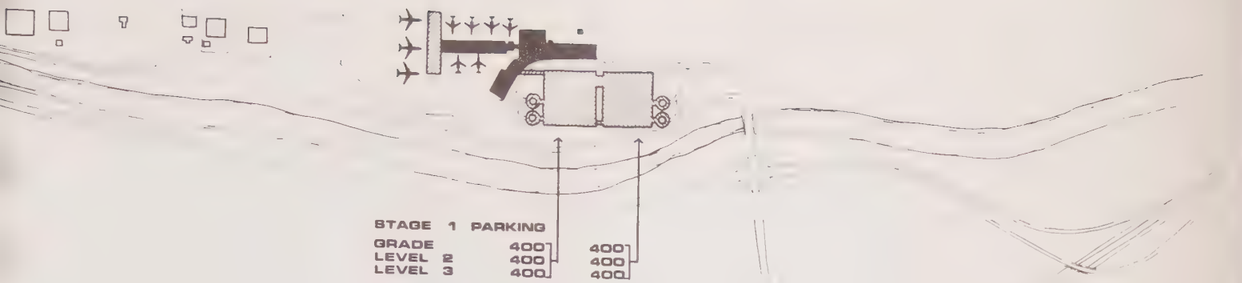
50 0 50 100 150

GROUND LEVEL PLAN

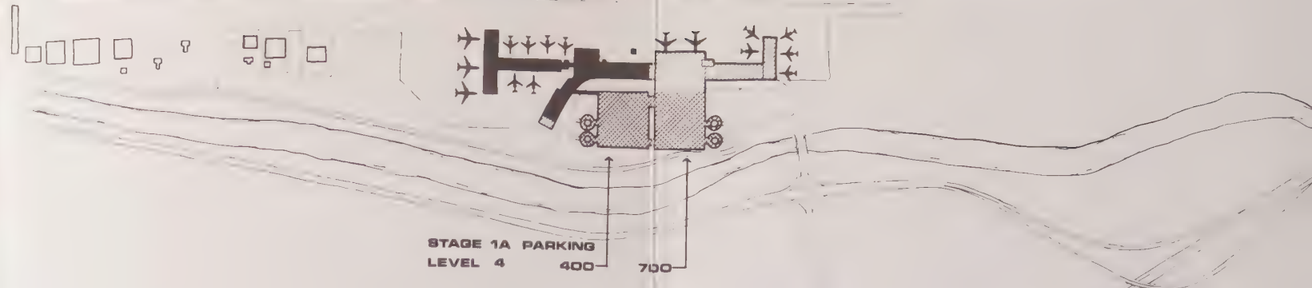
SECOND LEVEL PLAN

SAN JOSE MUNICIPAL AIRPORT

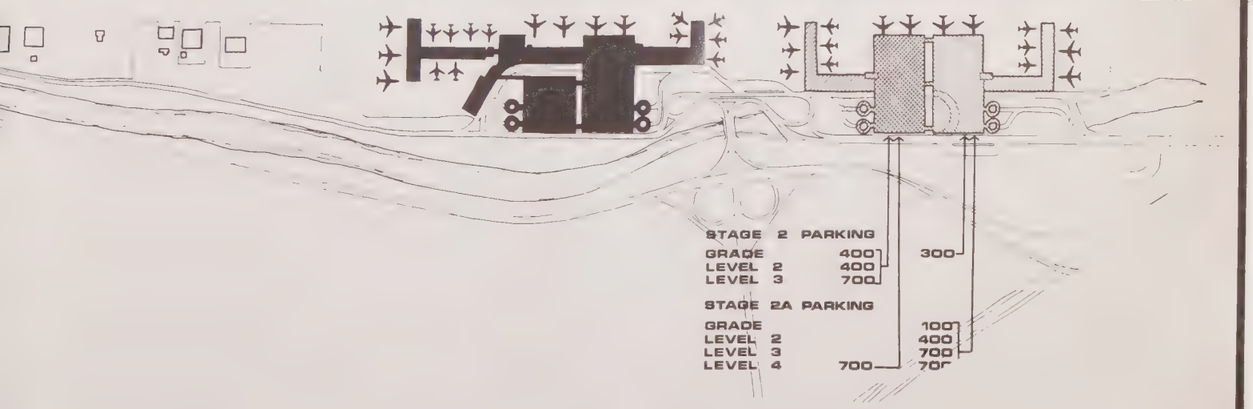
ARNOLD THOMPSON ASSOCIATES INC



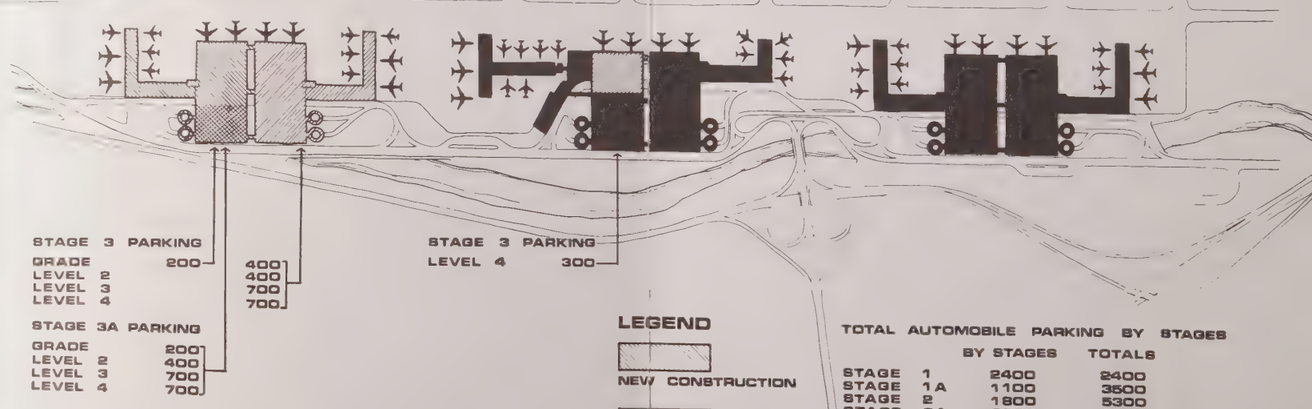
STAGE 1



STAGE 1A



STAGE 2 & 2A



LEGEND

NEW CONSTRUCTION

INDICATES NEW CONSTRUCTION ABOVE THE PREVIOUS STAGE

TOTAL AUTOMOBILE PARKING BY STAGES

		BY STAGES	TOTALS
STAGE	1	2400	2400
STAGE	1A	1100	3500
STAGE	2	1800	5300
STAGE	2A	2600	7900
STAGE	3	2700	10600
STAGE	3A	2000	12600

STAGE 3 & 3A

SAN JOSE MUNICIPAL AIRPORT

ARNOLD THOMPSON ASSOCIATES INC

Appendix A

Air Trade Review

AIR TRADE REVIEW

In order to plan for adequate passenger terminal facilities at San Jose Municipal Airport, it is first necessary to assess the probable demand for these facilities that will be generated by future air traffic. An airport, like any other transportation terminal facility, should provide for expeditious transportation services for the people, businesses, and industries of the area in which it is located.

The volume and type of air traffic generated at an airport depend directly upon the population and economic characteristics of the surrounding area.

The economic data presented herein is based primarily on information obtained from the County of Santa Clara Planning Department and the Association of Bay Area Governments. The information presented in this section of the report should not be considered as an economic analysis of the Greater San Jose Area but rather as a discussion of the relationship between economic factors and aviation demand.

The geographic area served by an airport is defined as the air trade area. Because San Jose and Santa Clara County are part of the San Francisco Bay Area[1/], any discussion of air travel demand at San Jose Municipal Airport must consider the historical pattern of civil aviation service and market demand in the Bay Area.

The San Francisco Bay Area is served by three major air carrier airports:

1/ The San Francisco Bay Area consists of nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

San Jose Municipal Airport, approximately three miles north of the central business district of the City of San Jose and within the City limits;

San Francisco International Airport, approximately 14 miles south of the City of San Francisco;

Metropolitan Oakland International Airport, located within the city limits of the City of Oakland.

San Francisco International Airport, the primary airport serving the Bay Area, provides both international and domestic airline service. While both Metropolitan Oakland International and San Jose Municipal airports have long- and medium-haul service, the majority of passengers using these airports are destined for West Coast cities.

Because of the geographic proximity of the three airports, there is a strong interrelationship among them. Table 1 sets forth the distribution of airline passenger origins and destinations for the three major Bay Area airports. This information was derived from data developed by Stanford Research Institute[1/] (SRI).

San Francisco International Airport, primarily because of the flight destinations and schedule frequencies available, serves passengers from the entire Bay Area.

Metropolitan Oakland International Airport's air trade area consists primarily of Alameda and Contra Costa counties.

1/ Survey of Airline Passengers Departing the San Francisco Bay Area, prepared for the San Jose MERCURY NEWS and the City of San Jose, California by Stanford Research Institute, May 1968.

Table 1

DISTRIBUTION OF PASSENGER ORIGINATIONS AND DESTINATIONS AT BAY AREA AIRPORTS[1/]

County	SJC Percentage	SFO Percentage	OAK Percentage
Alameda	6%	12%	70%
Contra Costa	0	8	20
San Francisco	0	26	6
San Mateo	4	17	0
SANTA CLARA	90	26	0
Other[2/]	0	11	10
Total:	100%	100%	100%

Notes: 1/ San Jose Municipal Airport (SJC); San Francisco International Airport (SFO); and Metropolitan Oakland International Airport (OAK).

2/ Includes: Marin, Napa, Solano, and Sonoma Counties.

Source: Arnold Thompson Associates, Inc., from data developed in Survey of Airline Passengers Departing the San Francisco Bay Area, Stanford Research Institute, May, 1968.

The San Jose Municipal Airport's air trade area consists of Santa Clara County together with portions of southern Alameda County (Fremont/Newark area) and southern San Mateo County (Menlo/Atherton area). Although responses of Santa Cruz County residents were not tabulated in the SRI study, it is reasonable to assume that a portion of San Jose Municipal Airport's passenger traffic is originating in Santa Cruz County.

For purposes of the following discussion, San Jose Municipal Airport's air trade (or market) area is defined as Santa Clara County, the Menlo/Atherton area in southern San Mateo County, and the Fremont/Newark area in southern Alameda County.

Tables 2 and 3 set forth population and employment statistics, respectively, for Santa Clara County only. (Comparable data is not available for the Fremont/Newark and Menlo/Atherton areas.) It is reasonable to assume that these data are indicative of the characteristics of those areas of San Mateo and Santa Clara counties served by San Jose Municipal Airport.

Santa Clara County has experienced dynamic growth during the past 30 years with population increasing from 174,949 in 1940 to some 1,057,000 in 1970, an increase of approximately 500%. A significant portion of this growth occurred between 1950 and 1960 when population increased more than 120%, from some 290,500 to some 642,300.

It is anticipated that Santa Clara County will continue to be one of the fastest growing areas of the United States, with the population projected to reach 1,387,000 by 1980 and 1,669,000 by 1990.

Table 2

POPULATION TRENDS AND FORECASTS
Santa Clara County

Year:	Actual[1/ & 2/] Population
1940	174,949
1950	290,547
1960	642,315
1964	853,500
1966	919,700
1968	1,011,900
1970	1,057,032
Forecast[3/]	
1975	1,231,000
1980	1,387,000
1985	1,536,000
1990	1,669,000

Population Growth

Year	Increase
1940-1950	66.1%
1950-1960	121.1%
1960-1970	64.6%

Sources: 1/ U.S. Department of Commerce, Bureau of the Census; 1940, 1950, 1960, and preliminary 1970.

2/ Sales Management, Survey of Buying Power.

3/ County of Santa Clara Planning Department.

Table 3

EMPLOYMENT PROFILE
Santa Clara County

Employment Category	1960[1/] Number	1960[1/] %	1970[2/] Number	1970[2/] %	1980[2/] Number	1980[2/] %
Agriculture, Agricultural Services, and Mining	11,700	5.1	5,000	1.1	2,000	.3
Contract Construction	17,800	7.8	25,000	5.8	33,000	5.5
Manufacturing	70,300	30.8	134,000	31.0	194,000	32.5
Trade	40,700	17.9	76,000	17.5	101,000	16.9
Wholesale	(6,400)	(2.8)	(14,000)	(3.2)	(19,000)	(3.2)
Retail	(34,300)	(15.1)	(62,000)	(14.3)	(82,000)	(14.7)
Transportation, Communication and Utilities	9,600	4.2	16,000	3.7	20,000	3.3
Finance, Insurance and Real Estate	7,900	3.5	16,000	3.7	23,000	3.9
Services	43,200	18.9	97,000	22.4	136,000	22.8
Government	26,800	11.8	64,000	14.8	88,000	14.8
Federal	(5,200)	(2.3)	(10,000)	(2.3)	(14,000)	(2.4)
State and Local	(21,600)	(9.5)	(54,000)	(12.5)	(74,000)	(12.4)
Total:	228,000	100.0	433,000	100.0	597,000	100.0

Sources: 1/ State of California, Department of Employment.

2/ County of Santa Clara, Planning Department, "Reasonable High Projection," December, 1968.

The employment profile for Santa Clara County, Table 3, indicates that total employment in the County will increase from approximately 433,000 in 1970 to some 597,000 by 1980, an increase of nearly 38%. While each employment category (except agriculture, services, and mining) will experience numerical increases between 1970 and 1980, most categories will retain their existing percentage of the total employment figures. Notable exceptions are manufacturing, services, and State and local governments, which will experience moderate increases. These changes reflect the growing urbanization and industrial diversification of Santa Clara County.

Tables 4 and 5 set forth comparative population and employment statistics, respectively, for San Jose Municipal Airport's air trade area (Santa Clara County, Fremont/Newark area, and Menlo/Atherton area) and for the total nine-county Bay Area.

In 1965, the San Jose Municipal Airport's air trade area accounted for approximately 24% of the total Bay Area population. This percentage is expected to increase to approximately 27% by 1975 and to nearly 29% by 1985.

Similar trends are apparent from the employment data set forth in Table 5. While providing 22% of the jobs in the Bay Area in 1965, the air trade area of San Jose Municipal Airport is expected to employ practically 26% of the Bay Area's workers by 1985.

It can be seen that the air trade area of San Jose Municipal Airport encompasses a major portion of the Bay Area's residents and an equally significant portion of the Bay Area work force.

Table 4

COMPARATIVE POPULATION TRENDS
San Francisco Bay Area
and
San Jose Municipal Airport Air Trade Area

	1965[1/]	1968[2/]	1975[3/]	1980[1/]	1985[3/]
Total Bay Area	4,403,334	4,591,000	5,472,200	6,150,800	6,832,200
Santa Clara County	902,133	1,011,900	1,204,300	1,435,500	1,605,900
Fremont/Newark Area	93,883	115,900[4/]	185,800	234,500	273,100
Menlo/Atherton Area	71,198	74,500[4/]	84,500	92,100	102,300
Total Air Trade Area	1,062,214	1,202,300	1,474,600	1,762,100	1,981,300
Percent of Total Bay Area	24.2%	24.3%	26.9%	28.6%	28.9%

Sources: 1/ Bay Area Transportation Study Commission, BATSC "Controlled Trends" Zonal Forecasts, 1965-1980-1990, May 1, 1969.

2/ Sales Management, Survey of Buying Power.

3/ BASAR Phase I Report, Aviation Forecast, prepared by Systems Analysis Research Corporation, May 1970.

4/ Interpolated from 1965 and 1975 data.

Table 5

COMPARATIVE EMPLOYMENT TRENDS
San Francisco Bay Area
and
San Jose Municipal Airport Air Trade Area

	1965[1/]	1968[2/]	1975[2/]	1980[1/]	1985[2/]
Total Bay Area	1,663,991	1,891,200	2,275,100	2,545,600	2,829,500
Santa Clara County	314,765	397,400	471,300	549,700	606,700
Fremont/Newark Area	30,146	37,600[3/]	50,300	62,200	72,800
Menlo/Atherton Area	20,531	25,900[3/]	35,100	40,700	46,600
Total Air Trade Area	365,442	460,900	556,700	652,600	726,100
Percent of Total Bay Area	22.0%	24.3%	24.5%	25.6%	25.7%

Sources: 1/ Bay Area Transportation Study Commission, BATSC, "Controlled Trends" Zonal Forecasts, 1965-1980-1990, May 1, 1969.

2/ BASAR Phase I Report, Aviation Forecast, prepared by Systems Analysis Research Corp., May 1970.

3/ Interpolated from 1965 and 1975 data.

Airline Traffic Activity

San Jose Municipal Airport is currently served by Air West, Continental Airlines, United Air Lines, and Western Air Lines. Service is also provided by three intra-state carriers: Air California, Holiday Airlines, and Pacific Southwest Airlines, as well as three commuter air carriers: Golden Pacific Airlines, Golden West Airlines, and Valley Airlines.

Historical air traffic originations at San Jose Municipal Airport for the five-year period 1965 through 1969 are listed in Table 6. Aircraft departures have increased steadily from 4,731 in 1965 to 30,196 in 1969, an increase of more than 500%. Enplaned passenger volumes have increased significantly from 47,923 in 1965 to 756,298 in 1969.

Table 7 outlines the historical airline activity, by carrier, for the five-year period 1965 through 1969. Since beginning service in 1966, Pacific Southwest Airlines (PSA) has consistently accounted for more than 50% of the total passenger traffic at the Airport. Because of the number of PSA flights available at San Jose Municipal Airport, PSA has been able to capture much of the San Jose-Southern California market.

Throughout the survey period, the interstate carriers, with the exception of SFO Helicopter Airlines, have carried all the enplaned airmail. United Air Lines, which began service to San Jose in 1968, has increased its share of the total traffic from 6% in 1968 to 16% in 1969. At the present time, most of United's flights are to the Chicago and New York areas. In 1969, Air California, PSA, and United Air Lines together accounted for 90% of the passenger traffic enplaning at San Jose Municipal Airport.

Table 6

HISTORICAL AIRLINE TRAFFIC ORIGINATIONS
San Jose Municipal Airport

Year	Aircraft Departures	Enplaned Passengers	% Change Enplaned Passengers	Average Daily Aircraft Departures	Passengers Enplaned per Flight	Enplaned Tons Cargo	Enplaned Tons Mail
1965	4,731	47,923	--	13	10.1	39.0	70.8
1966	6,697	162,748	+ 240%	18	24.3	19.5	--
1967	7,288	336,040	+ 106%	20	46.1	99.5	69.7
1968	14,481	514,118	+ 53%	40	35.5	273.9	107.1
1969	30,196	756,298	+ 47%	83	25.0	664.3	310.4

Source: Airport Management Records

Table 7

HISTORICAL AIRLINE[1] ACTIVITY
San Jose Municipal Airport

Year and Airline	Aircraft Landings	Enplaned Passengers	% Distribution Enplaned Passengers	Enplaned Tons Mail	Enplaned Tons Cargo
1965					
Pacific Air Lines	4,731	47,923	100.0	70.8	39.0
1966					
Cal-Neva	na	1,362	.8	-0-	-0-
Holiday Airlines	217	1,036	.6	-0-	-0-
Pacific Air Lines	4,868	48,601	29.9	-0-	-0-
Pacific Southwest Airlines	1,642	111,181	68.3	-0-	19.5
Sierra Pacific	na	568	.4	-0-	-0-
Total	6,697	162,748	100.0	-0-	19.5
1967					
Air California	304	10,382	3.1	-0-	1.0
Holiday Airlines	487	1,940	.6	-0-	-0-
Pacific Air Lines	2,889	33,729	10.0	69.7	40.9
Pacific Southwest Airlines	3,608	289,989	86.3	-0-	57.6
Total	7,288	336,040	100.0	69.7	99.5
1968					
Air California	3,034	84,241	16.4	-0-	28.6
Air West[2]	2,902	33,961	6.6	40.6	54.2
Cal-State Airlines	218	212	.0	-0-	-0-
Golden West Airlines[3]	1,664	3,175	.6	-0-	4.8
Holiday Airlines	157	1,817	.4	-0-	-0-
Pacific Southwest Airlines	5,430	360,070	70.0	-0-	142.2
United Air Lines	966	30,608	6.0	66.5	44.1
Valley Airlines	110	25	.0	-0-	-0-
Total	14,481	514,118	100.0	107.1	273.9

Table 7
Historical Airline* Activity (Cont.)
San Jose Municipal Airport

Year and Airline	Aircraft Landings	Enplaned Passengers	% Distribution Enplaned Passengers	Enplaned Tons Mail	Enplaned Tons Cargo
1969					
Air California	7,910	145,366	19.3	-0-	76.7
Air West	3,195	48,408	6.4	32.5	88.0
Cal-State Airlines	3,482	8,660	1.1	-0-	-0-
Golden Pacific Airlines	1,100	712	.1	-0-	-0-
Golden West Airlines	1,157	5,102	.7	-0-	3.0
Holiday Airlines	1,039	11,011	1.4	-0-	.4
Pacific Southwest Airlines	8,526	413,842	54.7	-0-	184.8
United Air Lines	2,537	121,260	16.0	277.9	311.4
Valley Airlines	1,250	1,937	.3	-0-	-0-
Total	30,196	756,298	100.0	310.4	664.3

1/ SFO Helicopter Airlines not included in this table; refer Table for this data.

2/ Pacific Air Lines merged with Air West during 1968.

3/ Sky Mark changed its name to Golden West Airlines during 1968.

Source: Airport Management Records

Table 8 sets forth historical air traffic activity for SFO Helicopter Airlines. Although annual departures have steadily increased, enplaned passengers in 1968 dipped to 21,787 from some 24,328 the previous year. This decrease might, in part, have been due to decreased schedule frequency and to an increase in fares necessitated by a reduction in subsidy.

Enplaned mail and cargo have decreased substantially since 1968.

Origin-Destination Patterns

A comparative analysis of ultimate origin-destination patterns of San Jose Municipal Airport passengers, based on a sampling of 10% of originations is set forth in Table 9. Origin-destination data are based on actual airline ticket sales, and indicate the ultimate point to which a passenger is destined, regardless of whether he makes the entire journey on one aircraft of one airline or changes aircraft and/or airlines one or more times to reach his destination. This information is collected and tabulated by the Air Transport Association and the Civil Aeronautics Board (ATA/CAB) and does not include data for the intra-state carriers such as PSA and Air California. In 1969, the interstate carriers, Air West and United Air Lines, accounted for less than 23% of the total passenger traffic at San Jose Municipal Airport. Therefore, the data presented in Table 9 do not give an entirely accurate indication of the origin-destination patterns of the total passenger market at San Jose.

It is important, however, to note the emergence of several long-haul cities such as Chicago, New York, Denver, Washington, D.C., Phoenix, Seattle, Portland, Detroit, and Boston as communities of air interest with San Jose. These cities were not significant in the 1964-1966 samples, since at that time, San

Table 8

HISTORICAL AIR TRAFFIC ACTIVITY

SFO Helicopter Airlines
San Jose Municipal Airport

Year	Aircraft Departures	Enplaned Passengers	Tons Enplaned Mail	Tons Enplaned Cargo
1966	na	17,993	-0-	-0-
1967	1,801	24,328	124.1	5.5
1968	3,009	21,787	138.6	3.6
1969	3,344	27,092	40.7	2.4

Source: Airport Management Records for Calendar Years noted.

Table 9

ORIGIN-DESTINATION ANALYSIS
(Communities of Air Interest)
San Jose, California

City of Origin or Destination	Air Miles	10% Sample - 1968 Passengers Number	%	Rank	10% Sample - 1966 Passengers Number	%	Rank	10% Sample - 1964 Passengers Number	%	Rank
Reno	188	2,199	15.3	1	978	8.5	2	1,808	16.1	2
Los Angeles	321	1,496	10.4	2	6,087	53.0	1	5,830	51.9	1
Las Vegas	391	1,166	8.1	3	130	1.1	10	311	2.8	6
Chicago	1,840	1,128	7.8	4	--	--	--	--	--	--
New York	2,561	815	5.7	5	--	--	--	--	--	--
Denver	940	763	5.3	6	--	--	--	--	--	--
Fresno	134	621	4.3	7	839	7.3	3	820	7.3	3
Santa Maria	198	511	3.5	8	813	7.1	4	581	5.2	4
Washington, D.C.	2,416	338	2.4	9	--	--	--	--	--	--
Phoenix	627	328	2.3	10	--	--	--	--	--	--
Seattle	696	284	2.0	11	--	--	--	--	--	--
Bakersfield	214	262	1.8	12	533	4.7	5	463	4.1	5
Portland	566	221	1.5	13	--	--	--	--	--	--
Detroit	2,074	180	1.3	14	--	--	--	--	--	--
Boston	2,692	177	1.2	15	--	--	--	--	--	--
Lake Tahoe	150	150	1.0	16	278	2.4	6	--	--	--
San Francisco	33	146	1.0	17	203	1.8	7	204	1.8	7
Sacramento	92	--	--	--	153	1.3	8	185	1.6	8
San Diego	423	--	--	--	134	1.2	9	126	1.1	9
Sub-total		10,785	74.9		10,148	88.4		10,328	91.9	
All Others		3,616	25.1		1,336	11.6		908	8.1	
TOTAL		14,401	100.0		11,484	100.0		11,236	100.0	

Source: ATA/CAB, Origin-Destination Survey of Airline Passenger Traffic for years noted.

Note: Origin-Destination Traffic of Intra-State Air Carriers not included - see text.

Jose did not have direct airline service to Midwest and East Coast cities. However, in 1968, United Air Lines began serving San Jose with flights to Chicago and New York.

For comparative purposes, Table 10 sets forth similar data for persons in the San Jose area making air trips during 1966. This information was derived from the San Jose MERCURY/NEWS Continuing Home Audit[1/], which asked for the distinations of airline trips made by the male head-of-household.

As might be expected, Los Angeles ranked first, with nearly 29% of the total trips. New York ranked second with 7.4%, while Washington, D.C. ranked third with 4.8%. Seattle and Chicago ranked fourth and fifth respectively,

Table 11 sets forth an analysis of direct airline service to San Jose Municipal Airport. In April of 1966, there were five non-stop flights to San Jose Municipal Airport from Los Angeles. The number of flights increased to 10 in 1968, and 17 in 1970, for a net increase of 12 non-stop flights between 1966 and 1970. Other significant changes were increases in non-stop flights to Burbank, Fresno, Monterey, Ontario, Sacramento, and Santa Ana. Table 11 also sets forth the net change in one-stop flights to San Jose for the same time period.

Tables 9, 10, and 11 indicate that there is a potential for improved airline service from San Jose to the following markets: New York, Washington, D.C., Seattle, Minneapolis, Kansas City, Honolulu, and Salt Lake City.

1/ San Jose MERCURY/NEWS, Metropolitan San Jose Continuing Home Audit, prepared by Facts Consolidated, Inc., and San Jose MERCURY/NEWS, 1966.

Table 10

DESTINATION SURVEY
Metropolitan San Jose Residents

City of Destination	Air Miles	Percentage	Rank
Los Angeles	321	28.9%	1
New York	2,561	7.4	2
Washington, D.C.	2,416	4.8	3
Seattle	696	4.4	4
Chicago	1,840	4.0	5
Minneapolis	1,578	3.7	6
Denver	940	2.8	7
Kansas City	1,490	2.7	8
San Diego	423	2.6	9
Las Vegas	391	2.2	10
Honolulu	2,413	1.8	11
Reno	188	1.8	12
Salt Lake City	587	1.8	13
Boston	2,692	1.7	14
Cleveland	2,151	1.4	15
Phoenix	627	1.4	16
St. Louis	1,720	1.1	17
Houston	1,627	1.1	18
Sub-total:		75.6%	
All Others		24.4	
Total:		100.0%	

Source: San Jose MERCURY NEWS, Metropolitan San Jose Continuing Home Audit, 1966.

Table 11

NUMBER OF DAILY* NON- AND ONE-STOP FLIGHTS

TO San Jose Municipal Airport

FROM	Air Miles	NON-STOP FLIGHTS April 1966	April 1968	April 1970	Numerical Change 1966-1970	ONE-STOP FLIGHTS April 1966	April 1968	April 1970	Numerical Change 1966-1970
Bakersfield	214	0	0	0	0	2	1	1	- 1
Burbank	302	1	0	8	+ 7	0	0	0	0
Chicago	1,840	0	0	2	+ 2	0	0	1	+ 1
Denver	940	0	0	1	+ 1	0	0	0	0
Eugene	468	0	0	0	0	0	0	1	+ 1
Fresno	134	2	0	9	+ 7	0	0	1	+ 1
Lake Tahoe	150	0	0	2	+ 2	0	1	0	0
Las Vegas	391	0	0	3	+ 3	0	0	1	+ 1
Los Angeles	321	5	10	17	+12	1	0	0	- 1
Monterey	52	0	2	8	+ 8	0	0	0	0
New York	2,561	0	0	0	0	0	0	1	+ 1
Oakland	37	0	5	0	0	0	0	0	0
Ontario	340	0	0	3	+ 3	0	0	1	+ 1
Palm Springs		0	0	1	+ 1	0	0	0	0
Paso Robles	150	2	2	0	- 2	0	0	0	0
Phoenix	627	0	0	0	0	0	0	3	+ 3
Reno	188	0	1	1	+ 1	1	0	0	- 1
Sacramento	92	0	2	5	+ 5	0	0	0	0
Salinas	57	0	0	1	+ 1	0	0	0	0
San Diego	423	0	0	0	0	0	3	0	0
San Francisco	33	7	5	5	- 2	0	0	0	0
Santa Ana	345	0	5	6	+ 6	0	0	0	0
Santa Barbara	239	0	0	0	0	0	0	2	+ 2
Santa Maria	198	0	0	2	+ 2	1	2	2	+ 1
Santa Rosa	88	0	0	0	0	0	0	1	+ 1
Stockton	54	1	0	1	0	1	0	1	0
Vandenberg AFB	206	0	0	0	0	1	0	0	- 1
Washington, D.C.	2,416	0	0	0	0	0	0	1	+ 1
TOTAL		18	32	75	+57	7	7	17	+10

*Flights scheduled for 4 to 7 days a week considered daily.

Note: Air carrier, commuter, intrastate and air taxi flights included; helicopter flights not included.

Source: Official Airline Guide for month and year noted.

Subsequent to April 1970, United Air Lines began non-stop service to New York (JFK) and Western Air Lines initiated one-stop service to Honolulu. Continental Airlines commenced San Jose-Portland/Seattle service on August 29, 1970.

By the end of 1970, San Jose Municipal Airport will have daily non-stop service to seven out of the ten top ranked origin-destination cities (Table 10) with Washington, D.C., Minneapolis, and Kansas City the exceptions.

Aircraft Operations

Historical data on aircraft operations[1/] at San Jose Municipal Airport are set forth on Table 12. During the six-year period from 1964 through 1969, total aircraft operations increased by approximately 48%, from some 271,100 in 1964 to some 400,534 in 1969. This increase is primarily attributable to the 375% increase in general aviation itinerant operations over the six-year period.

As indicated in Table 12, San Jose Municipal Airport has experienced a decline since 1967 of general aviation local operations, and a decline since 1968 of general aviation itinerant operations. This decline may be attributed to the fact that San Jose Municipal Airport is approaching capacity, and that general aviation users, particularly students, are electing to use other airports. It is expected that this trend will continue, and that air carrier operations will continue to increase with a continuing decrease in general aviation operations. Military operations have generally declined from a peak of 2,662 in 1966 to about 1,600 in 1969.

1/ An aircraft operation is defined as a takeoff or a landing of any aircraft.

Table 12

HISTORICAL AIRCRAFT OPERATIONS
San Jose Municipal Airport

Year	Air Carrier	% Change Air Carrier	General Aviation			Military			GRAND TOTAL
			Itinerant	Local	Total	Itinerant	Local	Total	
1964	11,920	--	118,613	138,486	257,099	793	1,288	2,081	271,100
1965	10,912	- 8.5	135,804	158,234	294,038	771	1,512	2,283	307,233
1966	19,668	+ 80.2	174,652	184,244	358,896	758	1,904	2,662	381,226
1967	22,571	+ 14.8	176,565	209,594	386,159	673	908	1,581	410,311
1968	38,222	+ 69.3	192,483	179,740	372,223	648	660	1,308	411,753
1969	56,889	+ 48.8	183,258	158,789	342,047	751	847	1,598	400,534

Sources: FAA, Air Traffic Activity, Calendar Years 1964 - 1968

FAA Tower Control Records, Calendar Year 1969